

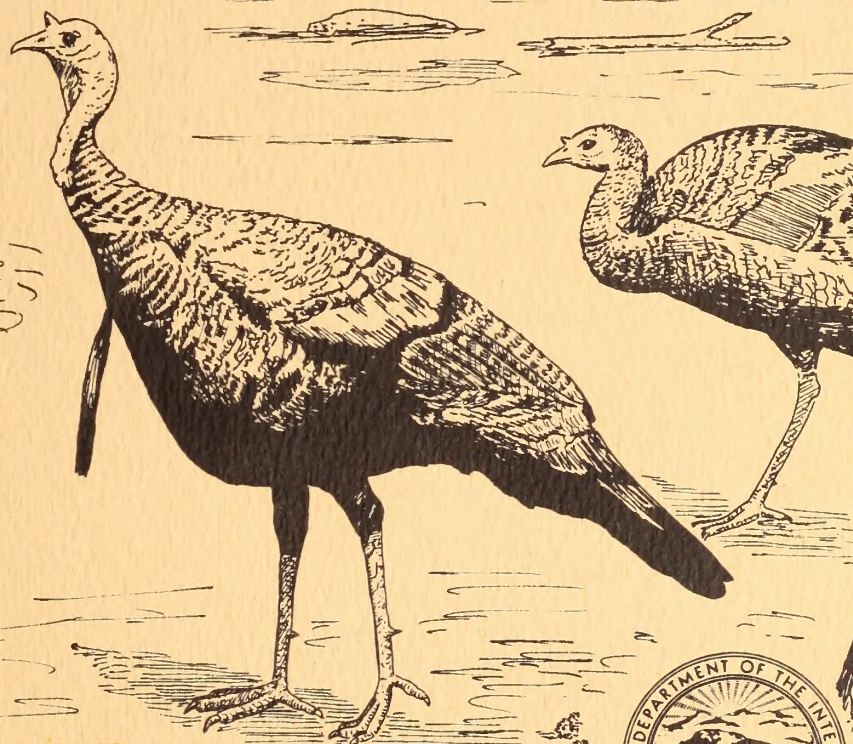
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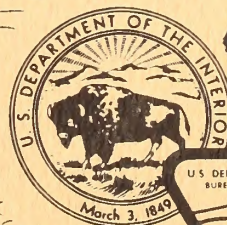
BROADUS -PUMPKIN CREEK BASELINE INVENTORY — WILDLIFE

Prepared by:
William L. Matthews



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ABSTRACT

The Bureau of Land Management (BLM) recently completed a wildlife inventory on a 245 square-mile tract in Powder River County. This study area encompassed two potential coal-lease areas, the Broadus coal field and the Pumpkin Creek coal field. Wildlife baseline data for this area was a prerequisite for making responsible decisions on possible coal leasing of these tracts in the future.

Information was collected on the occurrence, relative abundance, and habitat relationships of all wildlife species in the study area. All observations were placed in the BLM computer for data analysis, except small mammal trap data and non-game bird transects.

Approximately 6,700 wildlife observations were made during the study. Two replications of five major habitats were trapped each season, except winter and four non-game bird transects were run during June-early July 1980.

Major game species included mule deer, white-tailed deer, and antelope. The study area supported a good mule deer population. Five hundred observations involving 2,053 mule deer were recorded. Only 22 observations of white-tailed deer were recorded which was indicative of the small population that existed on the area. The area also supported a good antelope population with approximately eight-ten small herds found there.

Upland game birds included sage grouse, sharp-tailed grouse, ring-necked pheasant, gray partridge, and Merriam's turkey. Eight sage grouse strutting grounds were located. Four strutting grounds were relatively large, three smaller grounds were believed to be "satellite" grounds as they were only utilized briefly in the first portion of the breeding season, and one small ground was off the study area. Twenty-six sharp-tailed grouse strutting grounds were located on or near the study area with the majority located along Pumpkin Creek. Two ring-necked pheasant crow-count routes were run in late April-early May 1980. The western route along Pumpkin Creek averaged 7.6 crows per stop; whereas, the eastern route along U.S. Highway 312 only averaged 1.9 crows per stop. Only a few scattered flocks of gray partridge were found on the area; however, the area supported a good population of turkeys, and one wintering area was identified.

Thirteen species of raptors were identified. Nests were located for red-tailed hawks (5), golden eagles (3), prairie falcon (2), and one each for marsh hawk, kestrel, and great-horned owl.

Most waterfowl, shorebirds, and wetland species of birds were relatively uncommon, although they did migrate through this area in small numbers. Mallards and other dabbling ducks were the most common waterfowl species.

Coyote observations were scattered throughout the area; whereas, fox observations clustered around two general areas. Only minimal observations were made of furbearers and other predators normally harvested for their pelts.

Four species of amphibians and eight species of reptiles were identified. Noteworthy specimens included the plains hognose snake and the milk snake.

A total of 123 species of birds were identified. Although the two non-game bird routes had similar species composition, there were differences noted in the abundance of selected species which was probably a reflection of habitat differences along the routes. Of the non-game bird transects, the creek habitat had the most species followed by pine, sagebrush, and grassland in decreasing order of abundance.

Twenty-nine species of mammals were found on the area. Several nights mist-netting for bats resulted in the capture of only one little brown bat. Most of the other non-game mammals were relatively common. Small mammal trapping results showed deer mice and prairie voles were the most abundant species.

ACKNOWLEDGEMENTS

This study was a Bureau of Land Management project, conducted by BLM personnel in the Miles City District Office. We would like to extend our sincere appreciation to all who assisted in the project. Most of the landowners were extremely helpful and cooperative, allowing access to their land and providing invaluable information about wildlife in the area. Montana Department of Fish, Wildlife, and Parks personnel in Region 7 (Miles City) were very helpful. Special thanks is due to Jon Swenson and Arnold Dood for critical review of the report. The following BLM personnel in Miles City assisted in the project: Bill Linderfelt, Janet Edmonds, Peggy Phillips, Becky Holzheimer, Al Pierson, Dick Zander, and Gerry Gill. Special thanks is due to Don Johnson, Rose Davis, Debbie Weigel for computer analysis of the data, Fred Batson for aerial photography assistance, and Larry Davis for drawing the cover.

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INTRODUCTION

BACKGROUND

The Bureau of Land Management (BLM) is a federal land management agency charged with the responsibility of managing surface resource values on public lands and administering federal mineral estates on lands overlain by private surface. Because of the present energy situation, there has been an increased interest in coal. Vast amounts of coal exist within southeastern Montana, but there is very little information available for the other resource values on these areas.

Because a definite need exists for additional leasing of federal coal, a Federal Coal Management Program was established. Its overall purpose is to provide for an orderly development of federal coal resources by private industry to meet the demands and to do this in areas where environmental impacts can be minimized. Coal Lease Recommendation Areas were identified through the BLM Planning System with input from industry, the United States Geological Survey, various state officials, and the general public for possible coal leasing. However, before these areas can be leased, there are certain factors and resource values to consider which might be impacted or affected by coal leasing. Presently, BLM considers private landowner consent and all resource values/uses to identify areas which are suitable and unsuitable for surface coal mining.

Coal tracts in the Montana portion of the Powder River coal formation are being studied and analyzed by BLM personnel in Miles City to determine their suitability for possible leasing. In October 1979, BLM initiated an intensive inventory on two of these potential coal lease tracts, Broadus and Pumpkin Creek in the Powder River coal formation. These two potential coal lease tracts were considered as one study area for wildlife inventory purposes. This area was studied to determine the wildlife resource values and to address the wildlife unsuitability criteria for coal leasing. The objectives of the study were as follows:

1. Identify and document the occurrence and distribution of the wildlife species on the study area.
2. Identify and document critical wildlife habitat on the study area, i.e. big game wintering grounds, sharptailed/sage grouse strutting grounds, etc.
3. Identify and document the actual habitat utilization of this area by wildlife species, e.g. seasonal use areas, migration routes, if known.
4. Identify and document any habitat conflicts or problems with the present utilization of this area for wildlife species.
5. Identify suitable, but unoccupied, habitat for wildlife species.
6. Identify and document any endangered species or endangered species habitat on the study area.

The Broadus-Pumpkin Creek inventory was originally set up for a one year study (four seasons). Data collection commenced in October 1979 and terminated in February 1981. The study was extended because the winter season 1980 was atypical and unusually mild. Data collection for the fall-winter season 1980 was repeated to compensate for the unusual winter; however, data collection was terminated February 1981 because the second winter conditions were similar to the previous year.

DESCRIPTION OF THE STUDY AREA

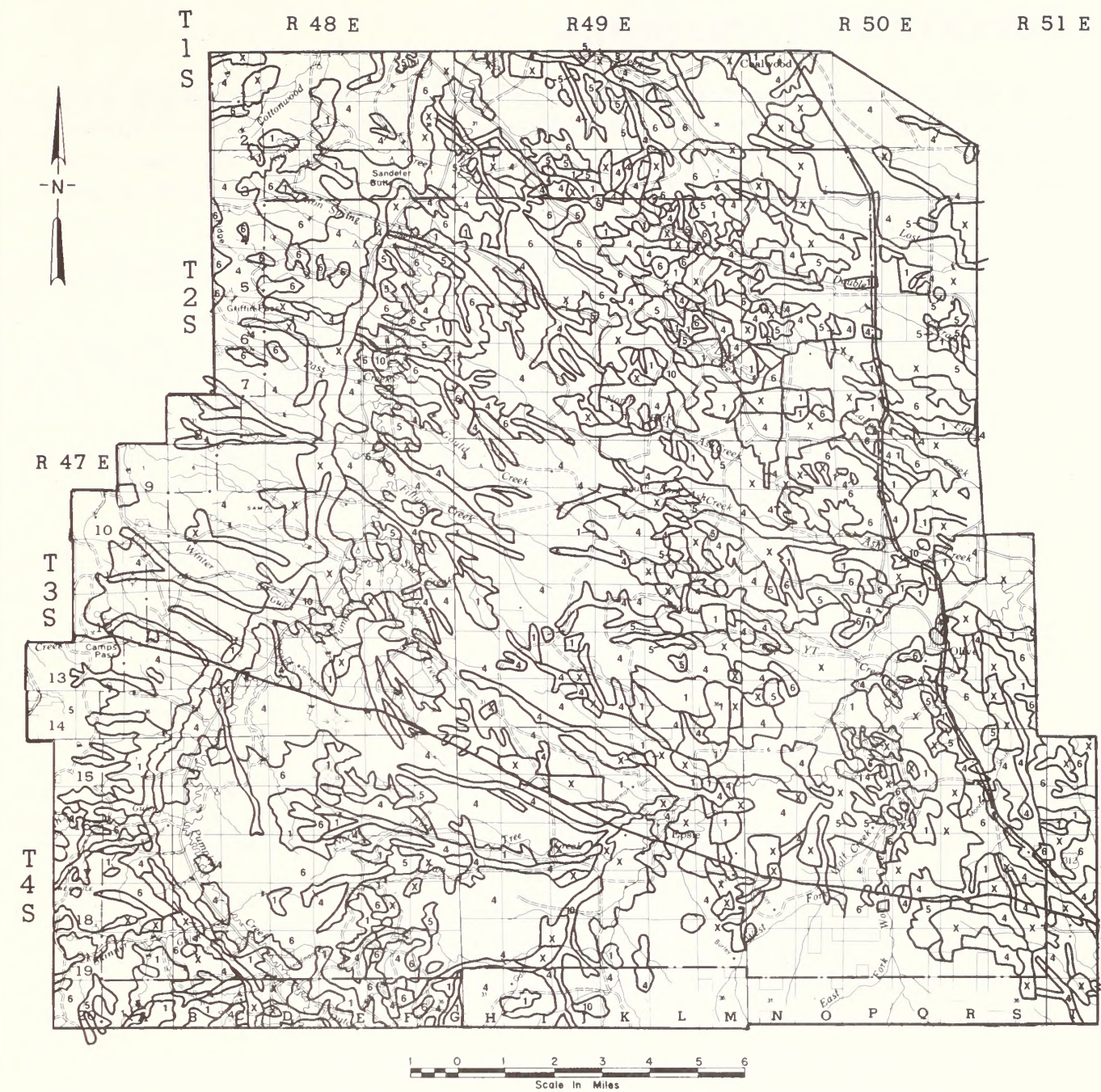
The Broadus-Pumpkin Creek study area encompassed 245 square miles (approximately 156,640 acres) and was located in Powder River County (Figure 1). Generally, the eastern boundary followed U.S. Highway 312, except for a small portion on the southern edge. The western boundary was Custer National Forest. The northern and southern boundaries were somewhat arbitrary. These boundaries were determined to coincide with the southern most/northern most extension of the coal tracts, themselves. The study area and its relationship to the state of Montana is shown in Appendix A.

The surface ownership was divided as follows: private landowners (91.6%), state land (5.4%), and federal land (3.0)%. The subsurface coal mineral estate is 45.19% and 65.7% federal for the Pumpkin Creek and Broadus coal fields respectively, with the remaining coal estate in state and private ownership.

CLIMATE

Climate for the area is best described as continental with cold winters, warm summers and marked variation in seasonal precipitation. The annual precipitation averages 13.59 inches, while winter snowfall/sleet averages 37.7 inches (U.S. Department of Commerce, 1977). Most precipitation occurs in June. The coldest month is January with an average temperature of 17.8°F and July is the warmest month with an average temperature of 71.2°F (U.S. Department of Commerce, 1977).

Climatic factors fluctuated considerably from the norms during the study period. Temperature and precipitation averages at the Broadus station for 1979-1980 are shown in Appendix B (U.S. Dept. of Commerce, 1979 and 1980). In summary, average temperatures for 1979 were slightly below normal, while the average precipitation was 3.58 inches below normal. Data for 1980 was available only through November; however, average precipitation was 2.63 inches below normal at that time. This and an average temperature slightly above normal for most of the spring-summer period compounded the drought conditions of 1979 even further. In turn, the drought conditions may have directly influenced the data and results obtained in this study.



BROADUS—PUMPKIN CREEK WILDLIFE STUDY AREA

BROADUS — PUMPKIN CREEK WILDLIFE STUDY AREA AND HABITAT TYPES LEGEND:

- | | |
|------------------------|-------------------|
| 1. Grassland | 6. Ponderosa Pine |
| 4. Sagebrush | 10. Creek |
| 5. Skunkbush/Snowberry | X Agriculture |

FIGURE 1

TOPOGRAPHY AND SOILS

Topography in the study area is best described as rolling, nearly flat areas with scattered buttes and flat-topped mesas (URA — .32 Topography). Numerous clinker buttes and ridges dot the rolling plateaus. Principal drainages for the area are Pumpkin Creek and Mizpah Creek. Both streams flow northward. Pumpkin Creek eventually flows into the Tongue River, whereas Mizpah Creek drains into the Powder River.

Soils for the area fall within three main associations and are briefly described below (URA — .35 Soils).

1. Elso-Midway-Thurlo association — nearly level to steep; silt loams and clay loams that are shallow over stratified sandy, silt and clayey shale, and deep soils that are dominantly silty clay loam throughout; on uplands; 0-45% slope.
2. Haverson-Glenberg association — nearly level to gently sloping; deep silt loams and fine sandy loams underlain mainly on flood plains, terraces and fans; 0-45% slope.
3. Ringling-Cabba-Midway association — sloping to steep or hilly; shallow slatey loams to clay loams underlain by shale; on uplands; 2-45% slope.

HABITATS

The study area lies within the Great Plains-Shortgrass Prairie Province-Grama-Needlegrass-Wheatgrass Section as described by Bailey (1978). Packer (1974) described the study area as three major vegetation types: shortgrass prairie, grassland-sagebrush and ponderosa pine forest.

Five major habitats were delineated on the study area (Figure 1). Also, homesite was utilized to describe observations that occurred around houses, farm buildings, etc., and reservoir was used to describe observations that occurred at reservoirs and small potholes. Habitat types and their descriptions were taken from the Coalwood Planning Unit Resource Analysis (URA-.34 Vegetation).

Grasslands comprised 13,220 acres or 8.4 percent of the area. This type was generally found on the flat to gently rolling hills above drainages. Dominant grasses were western wheatgrass (*Agropyron smithii*), junegrass (*Koeleria cristata*), blue grama (*Bouteloua gracilis*), needle-and-thread (*Stipa comata*), green needlegrass (*Stipa viridula*), red threeawn (*Aristida longiseta*), and threadleaf sedge (*Carex filifolia*). Common forbs included yellow sweetclover (*Melilotus officinalis*), cudleaf sagewort (*Artemisia ludociana*), western yarrow (*Achillea lanylosa*), fringed sagewort (*Artemisia frigida*), silver-leaf scurfpea (*Psoralea argophylla*), aster (*Aster spp.*), and numerous annuals.

Sagebrush made up 84,366 acres or 53.9 percent of the area. Although it was found in similar areas as the grassland, it was also quite common adjacent to drainages. Major grasses were western wheatgrass, green needlegrass and junegrass. Forbs are cudleaf

sagewort, western yarrow, lupine, locoweed and salsify. Dominant shrub or brush species were silver sagebrush (*Artemisia cana*) and big sagebrush (*Artemisia tridentata*).

Ponderosa pine (*Pinus ponderosa*) habitat comprised 27,898 acres or 17.8 percent and was usually found on dry, north and northwest slopes above drainages and on clinker formations. Dominant species were ponderosa pine and Rocky Mountain juniper (*Juniperus scopulorum*). Creeping juniper (*Juniperus horizontalis*), skunkbush sumac (*Rhus trilobata*), rose (*Rosa woodsii*), snowberry (*Symphoricarpos occidentalis*), and a variety of grasses formed the understory and ground cover.

Creek habitat made up 3,305 acres or 2.1 percent of the study area and was found primarily along perennial streams and their tributaries. It was characterized by plains cottonwood (*Populus sargentii*), box elder (*Acer negundo*), green ash (*Fraxinus pennsylvanica*), willow (*Salix spp.*), chokecherry (*Prunus virginiana*), wild plum (*Prunus americana*), and buffaloberry (*Shepherdia argentea*) in the overstory. Rose, snowberry, red osier dogwood (*Cornus stolonifera*), silver sagebrush, cattails (*Typha latifolia*) and a variety of sedges, rushes and grasses formed the understory and ground cover.

Agriculture comprised 27,851 acres (17.8 percent) of the area. The majority of this acreage was found along creeks and level to slightly rolling plains and plateaus. Wheat (*Triticum spp.*), oats (*Avena sativa*), and sorghum (*Sorghum vulgare*) were the common small grains. Hay meadows of alfalfa (*Medicago sativa*) and cultivated grasses were also common.

MATERIALS AND METHODS

Several different techniques were used to inventory wildlife species on the study area. All vertebrate species that were encountered, i.e. amphibians, reptiles, birds, and mammals were identified and recorded.

GAME SPECIES

A windshield survey route was established and utilized to obtain data on game species (Appendix C). This particular route was selected because of its accessibility during periods of adverse weather. Normally, this route was run during early morning or late evening hours when game species activities were greatest. Information recorded were species, location, sex and age class, numbers and habitat type. All vertebrate species were recorded, except during the summer period when birds were not recorded by this technique.

Incidental observations were made while transversing the area on vehicle and foot. Much of this information was collected while looking for raptors and nests, grouse leks, etc.

Aerial surveys were made monthly or as needed (exception — September-November 1980), using low-level flights in a Super Cub. The study area was transversed by flying grid transects during the early morning hours. Occasionally, this technique was used to collect specific information, e.g. raptor nests, grouse strutting ground, reproduction data on game species, etc.

A sage/sharptailed grouse strutting ground survey was conducted during late March-early May. Grounds were located by periodically stopping the vehicle and listening or by flying over likely areas in an airplane. Each ground was located and checked at least twice to insure that the lek was the actual ground and not a social interaction by grouse during this period and to try to determine the maximum number of males visiting the ground. Information was recorded on grouse strutting forms for permanent file at BLM.

Two pheasant crow routes were established and run according to the technique described by Gates (1966). The first route along Pumpkin Creek was 22 stops in length and was run three times during May. Although the route was run three times, the third replication was discarded because of gross deviations in this data from the two previous replications. The other route, 18 stops in length, was along U.S. Highway 312 and was run twice during May. Exact locations of the routes are shown in Appendix C.

Waterfowl were censused by visiting reservoirs and creeks during early spring-summer to obtain information. Broods were also recorded during late summer when observed.

NON-GAME SPECIES

Amphibians and Reptiles

Amphibians and reptiles were identified when they were observed on the area. Occasionally, springs, creeks, and reservoirs were visited to obtain specific information on amphibians and reptiles.

Birds

Two vehicle routes were established to census non-game birds (Appendix D). The route survey was a modification of the Breeding Bird Survey (Robbins and Van Velzen, 1967). Each route, 25 stops spaced one-half mile apart, was run once a month from April-September, except both routes were run twice per month for June. All wildlife species that were seen along the route were recorded according to the predominant habitat in which they were observed. The rationale behind these modifications was to insure that sufficient data on migrant/breeding birds, as well as other wildlife species, was collected. The technique was therefore used as a systematic method of data collection rather than as an actual breeding bird survey.

Walking transects in the four major habitats were established because of dissatisfaction with the habitat interspersion along the vehicle routes and to insure that most breeding birds were recorded (Appendix D). Each transect was 1,600 feet long and 200 feet wide,

except for the grassland transect which was 3,200 feet long by 200 feet wide. During the period from early June-mid July, the transects were walked and all birds, their numbers and locations were recorded on transect forms. Nests were also located when possible. Transects in two different habitats were traversed each morning beginning approximately 30 minutes before sunrise and were completed before 0800. Seven replications were completed for each habitat type. Transect data was collected as additional information and was kept separate from the data that was placed in the computer.

Raptor nests were located by searching likely areas from foot, vehicle and airplane. Creekbottoms, cliffs, etc. were searched during early spring-early summer. Nests that were located were rechecked, if possible, to determine their success. Also, information was recorded on raptor nest inventory forms for permanent file at BLM.

Incidental observations of unusual and uncommon bird species that were observed while transversing the area were also recorded.

Mammals

Small mammals were trapped each season, except winter, in each of the five habitats. Two different representative areas for each habitat were trapped each season (Appendices E and F). Traplines consisted of 25 stations approximately ten yards apart with four traps per station. A Sherman live trap and three snap traps (rat trap every third station) were set at each station. Peanut butter and oatmeal were used as bait. Traplines were set and checked daily for four successive nights. All small mammals captured were exterminated and identified. Questionable and unusual specimens were sent to Montana State University for verification. Traps which were sprung but empty were subtracted from the total trap nights as a correction factor in data tabulation.

Several nights were spent trying to collect bats. Mist nets were set up in openings along creeks/drainages with very limited success.

Incidental observations of furbearers, predators and other non-game mammals were recorded while working on the area.

All data, excluding small mammal trap data and non-game bird transect data, was computerized and summarized by BLM's computer in Billings, Montana. All original data and computer printouts are permanently filed at BLM's District Office in Miles City, Montana.

RESULTS AND DISCUSSION

All wildlife species are discussed below in their respective sections. The relative abundance for each species was determined by their frequency of capture or observations, plus information from landowners/residents and previous studies/reports for the area. Habitat utilization, for the most part, is merely a listing of species, the number of

observations and the habitats that they were observed in. This is not meant to imply a habitat preference for the species, but, rather habitat utilization as observed in this study. The reason for this is that the sample size of the total observations was often too small to show definite habitat preference.

MULE DEER

POPULATION

Mule deer production and population characteristics are shown in Table 1 and harvest statistics are shown in Appendix G. Most of the figures are relatively close to Swenson's (1980) preseason and postseason results for Region 7. The high percentage of bucks was somewhat unusual, particularly since Martin (1980) reported 8.2-10.4 percent bucks in Otter Creek and Hanging Woman Creek during September-October 1979, but our figures were consistently high from winter 1979-winter 1980. Swenson (1978) also reported high percentages of mule deer bucks (29.1 percent bucks-winter 1976-1977 and 25.6 percent bucks-fall 1977) at Intake. These figures are more in line with the ones found in this study. Based on Eustace's (1974) fall mule deer fawn:doe production ranking criteria ratios of 40-59 fawns:100 does, poor; 60-79:100, fair; 80-99:100; good, fawn production was good-excellent on the study area. Martin (1980) found 118.6 and 92.2 fawns per 100 does in October 1979 on the Otter Creek and Hanging Woman Creek study areas, respectively, which compares favorably to the 106.8 fawns per 100 does in December 1979-January 1980 found here.

TABLE 1
MULE DEER PRODUCTION AND CLASSIFICATION

DATE	SAMPLE SIZE	BUCKS 1/	DOES 1/	FAWNS 1/	FAWNS: 100 Does	FAWNS: 100 ADULTS	BUCKS: 100 DOES
Dec '79-Jan '80	76	16(21.0%)	29(38.2%)	31(40.8%)	106.8	68.8	55.2
Sep '80-Oct '80	258	60(23.3%)	102(39.5%)	94(36.4%)	92.2	58.8	58.0
Dec '80-Jan '81	138	21(15.2%)	54(39.1%)	63(45.6%)	116.6	84.0	38.9

1/ Number of individuals (percentage of sample size).

Group size varied from one-26 mule deer (Figures 2-6). Summer groups were usually does with fawns, but as fall approached, larger groups began to form. Most of the large groups were formed by winter and they remained together until spring dispersal. Approximately 20% of the total observations for the winter 1980 involved groups of 10 or more mule deer (Figure 3). Although most observations were recorded for the spring-summer periods, there were not more deer during these seasons, rather this is a reflection of the amount of time that was spent in the field during these seasons.

Also noteworthy regarding the mule deer population was the observation of an albino mule deer fawn. Albinism is very unusual, but probably not quite as rare as is generally believed. Gardner (1968) determined that albinism occurs approximately 1:40,000 in human populations. The unusual part of this observation was the extent of albinism in this fawn. Several personnel from the Montana Department of Fish, Wildlife, and Parks in Region 7 had seen or heard of partial- albino deer but the photograph showed this mule deer to be a true albino, complete with pink eyes and ears. Several ranchers also mentioned an albino mule deer that they had seen near this area several years previous to this sighting.

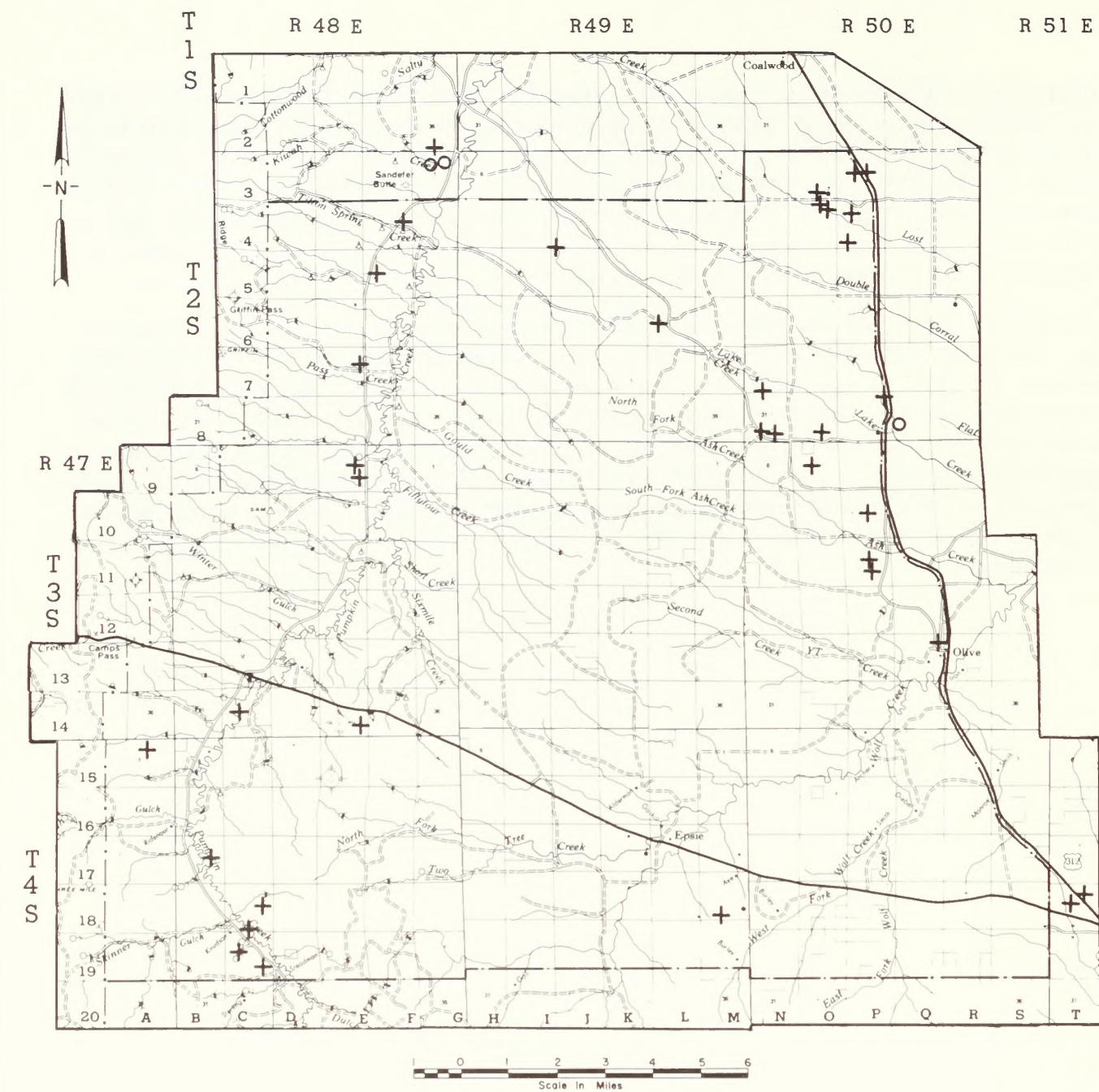
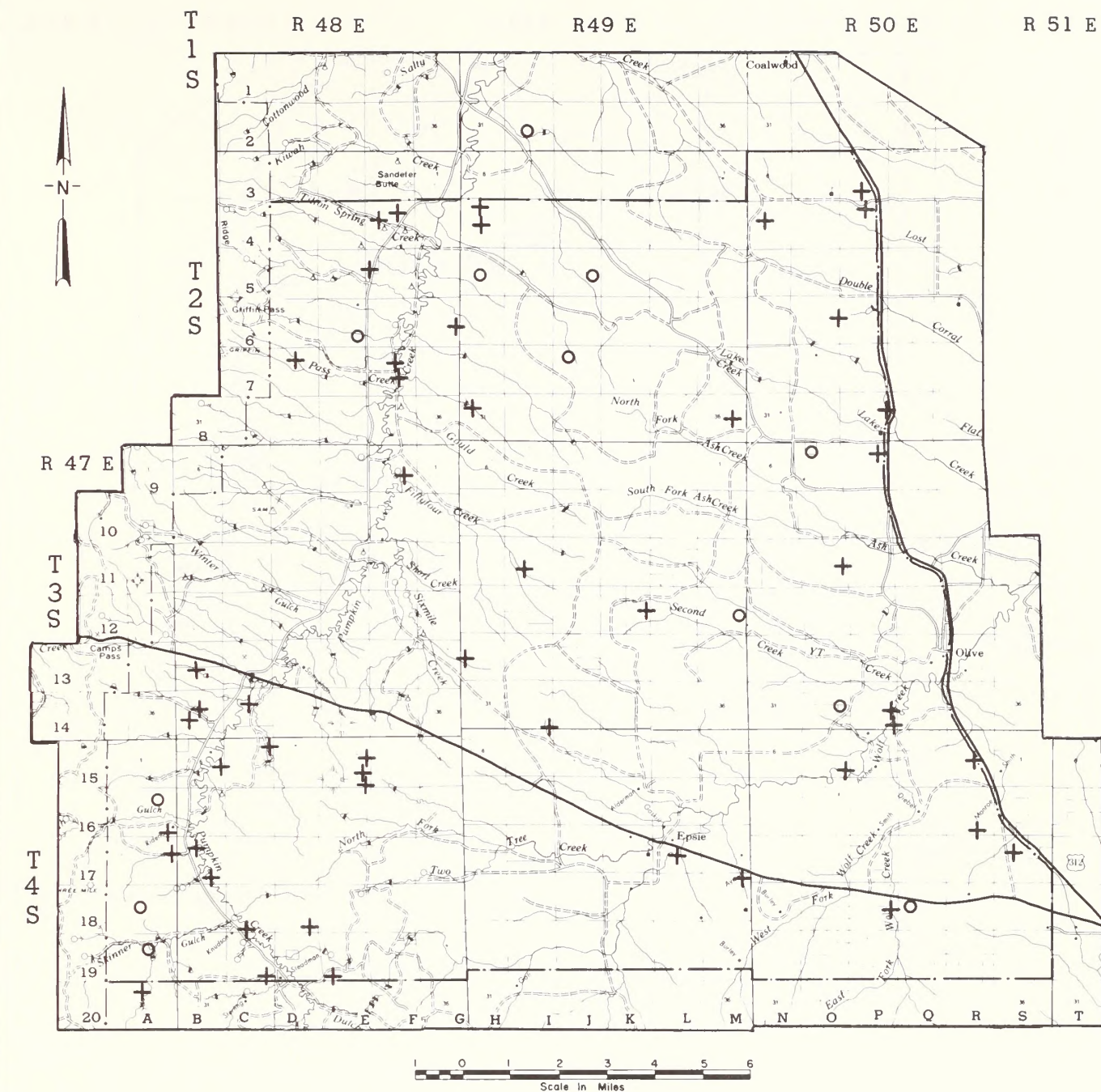


FIGURE 2



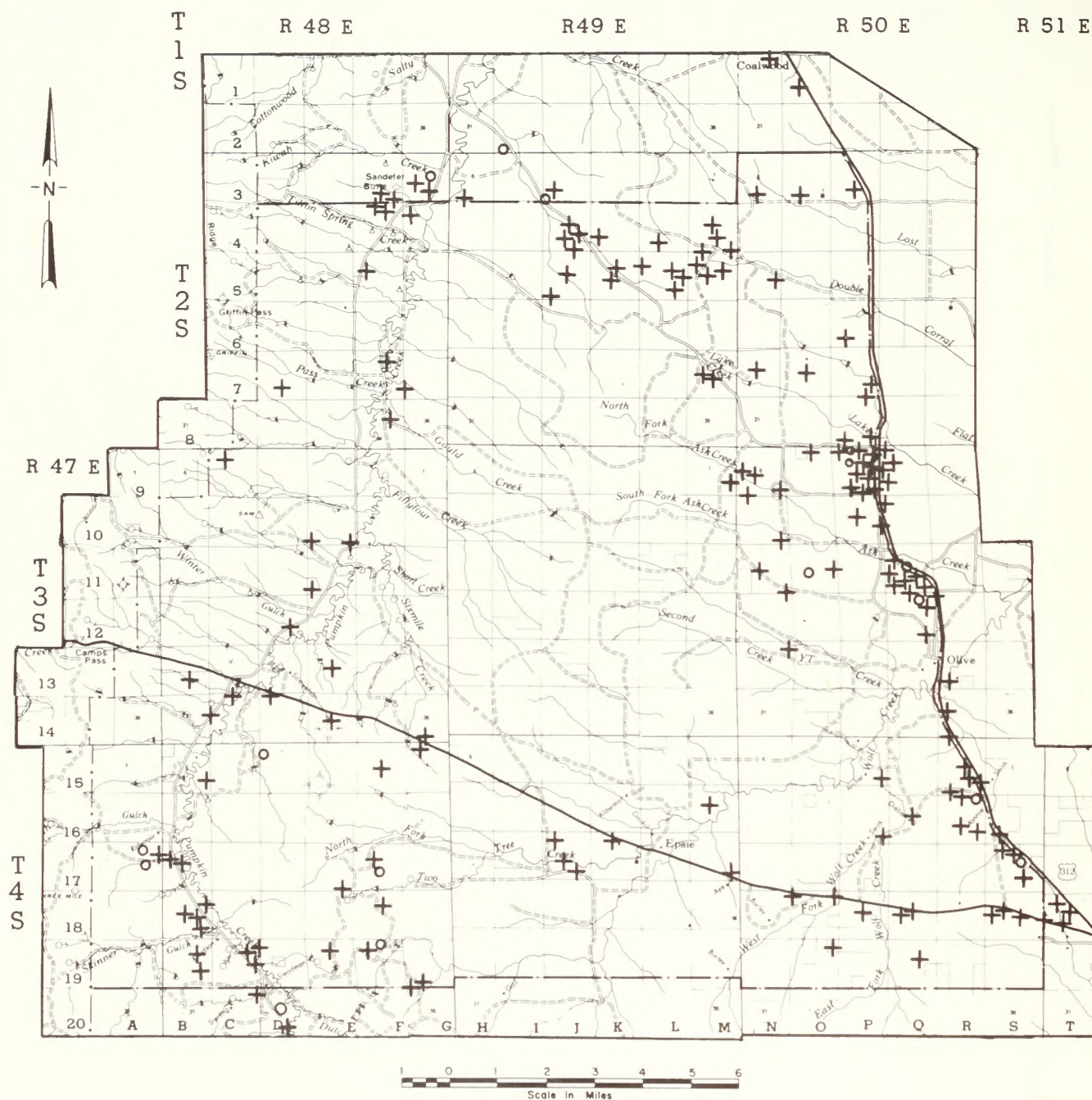
BROADUS—PUMPKIN CREEK WILDLIFE STUDY AREA

**MULE DEER OBSERVATIONS FOR
JANUARY, FEBRUARY, MARCH 1980
AND JANUARY 1981**

LEGEND:

- Group of 10 or More
- + Group of Less Than 10

FIGURE 3



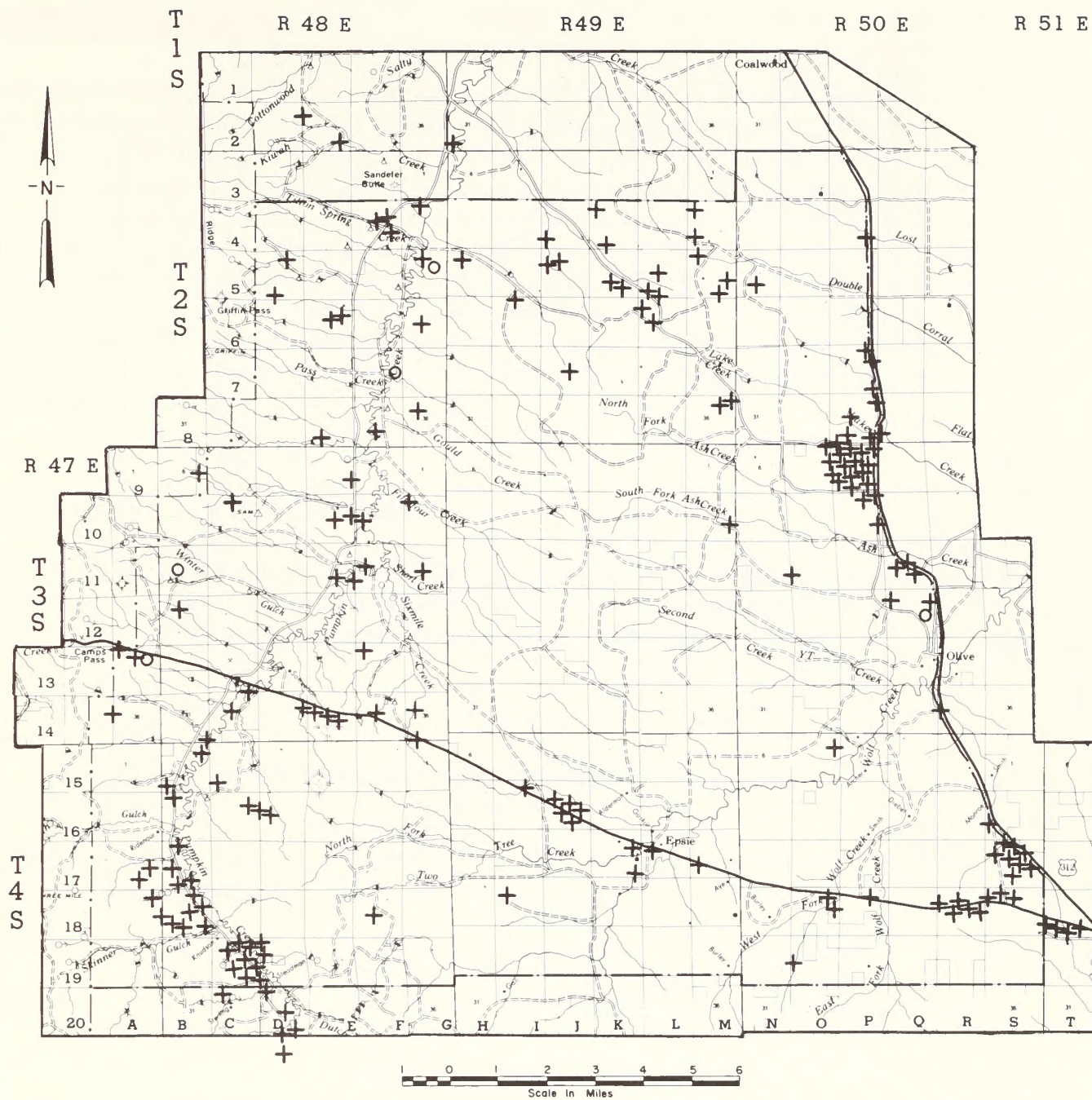
BROADUS—PUMPKIN CREEK WILDLIFE STUDY AREA

**MULE DEER OBSERVATIONS FOR
APRIL, MAY, JUNE 1980**

LEGEND:

- Group of 10 or More
- + Group of Less Than 10

FIGURE 4



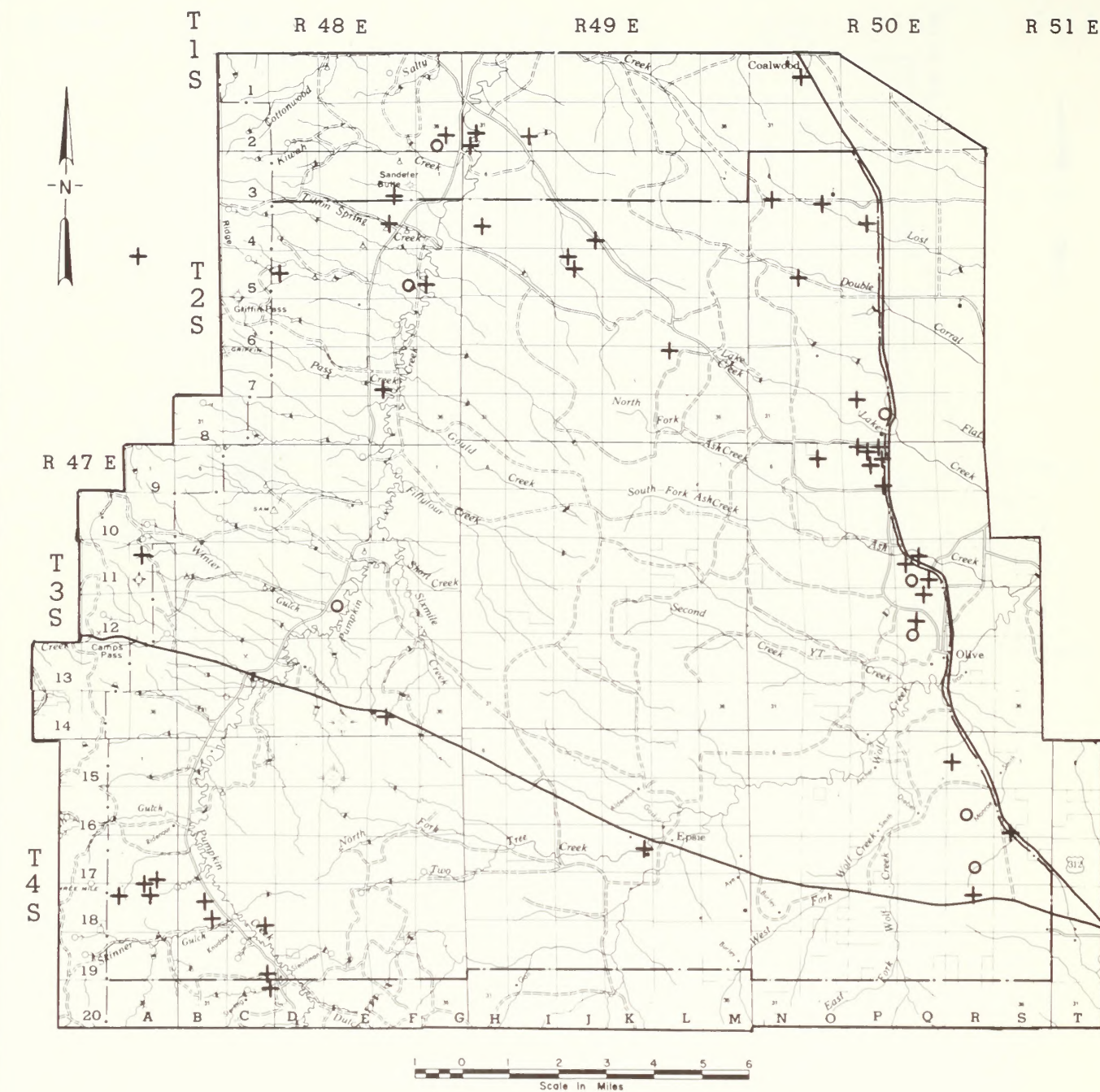
BROADUS—PUMPKIN CREEK WILDLIFE STUDY AREA

MULE DEER OBSERVATIONS FOR
JULY, AUGUST, SEPTEMBER 1980

LEGEND:

- Group of 10 or More
- + Group of Less Than 10

FIGURE 5



BROADUS—PUMPKIN CREEK WILDLIFE STUDY AREA

MULE DEER OBSERVATIONS FOR
OCTOBER, NOVEMBER, DECEMBER 1980

LEGEND:

- Group of 10 or More
- ⊕ Group of Less Than 10

FIGURE 6

DISTRIBUTION

Fall distribution for 1979 is shown in Figure 2. Most of the observations were scattered observations of small groups. Distribution during the winters of 1980-81 is shown in Figure 3. Although there were observations of larger groups, mule deer were not concentrated and remained widely distributed in the area because of the unusually mild winters. Swenson (1980) mapped mule deer winter ranges in the area for the winters of 1977-1978 (Figure 7). We had initially hoped to refine this data and areas but the mild winters precluded this. Spring and summer 1980 distribution is shown in Figures 4 and 5. Observations are again scattered, indicating some dispersal, but they were still in the same general areas. Fall 1980 distribution (Figure 6) showed some groups beginning to form again and slightly more concentration of the mule deer. However, they are still somewhat dispersed.

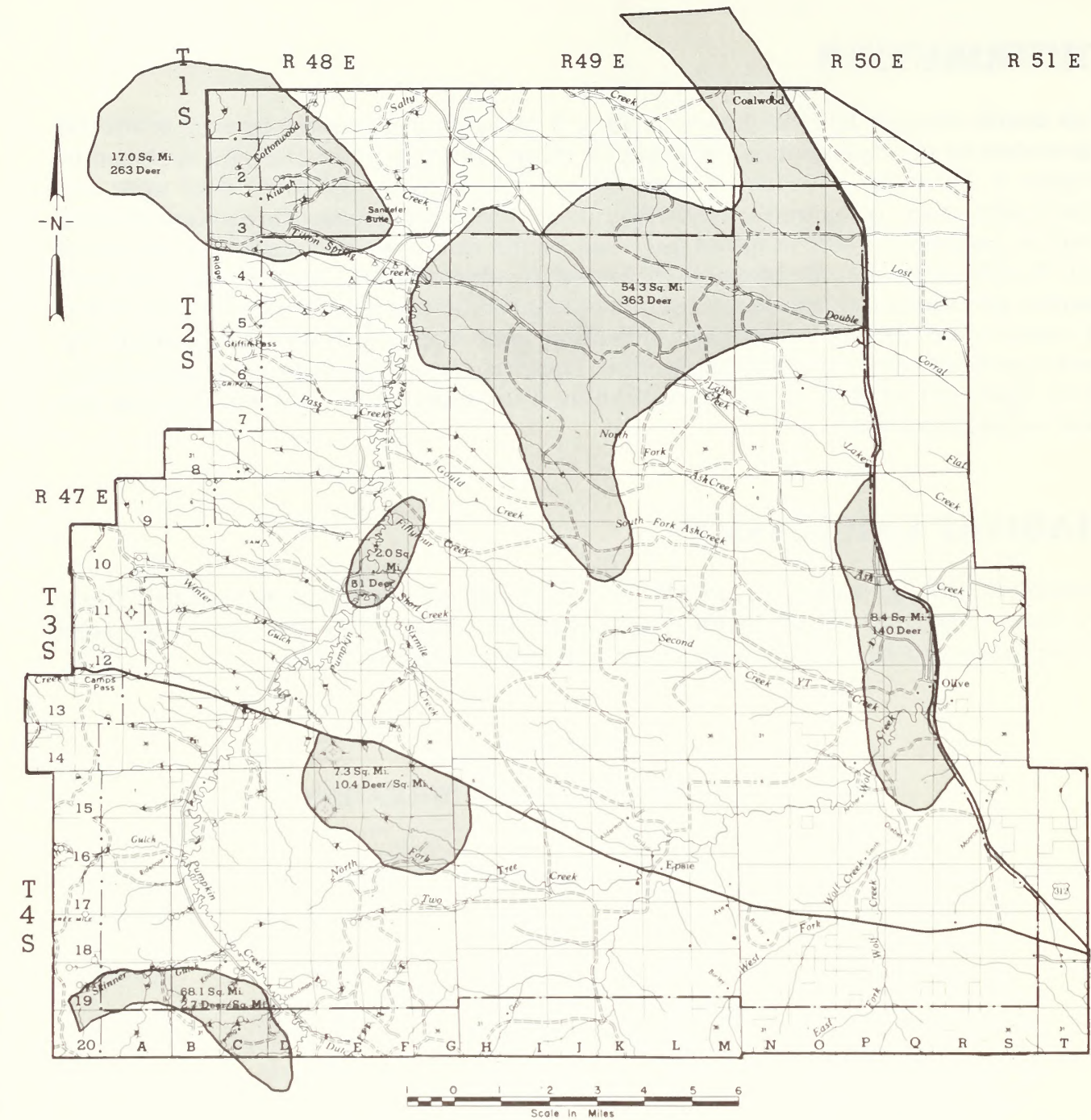
HABITAT UTILIZATION

Monthly habitat utilization revealed little or no significant differences seasonally (Table 2). For the most part, the pine habitat was utilized for cover and the mule deer moved out in the grassland, sagebrush, agriculture, and creek bottoms to feed.

TABLE 2
MULE DEER SEASONAL HABITAT UTILIZATION

HABITAT	FALL 1979 1/	WINTER 1980 JAN. 1981 1/	SPRING 1981 1/	SUMMER 1980 1/	FALL 1980 1/
Grassland	55(43.0%)	225(57.1%)	317(43.9%)	130(25.1%)	88(30.1%)
Pine	34(26.6%)	128(32.5%)	118(16.3%)	124(24.0%)	66(22.6%)
Sagebrush	25(19.5%)	38(9.6%)	151(20.9%)	104(20.1%)	32(11.0%)
Agriculture	8(6.3 %)	2(0.5%)	102(14.1%)	83(16.1%)	17(5.8%)
Creek	6(4.7 %)	—	17(2.4%)	70(13.5%)	89(30.5%)
Homesite	—	1(0.3%)	—	1(0.2%)	—
Pine - Grassland	—	—	17- 2.4%	5- 1.0%	—
Total	128	394	722	517	292

1/ Number of deer (percentage of total observations for the season.)



BROADUS—PUMPKIN CREEK WILDLIFE STUDY AREA

MULE DEER WINTERING AREAS

LEGEND:

Total Area — Number of Deer or Density

SOURCE:

Big Game Survey and Inventory (Deer), Region 7, 1980.
Montana Department of Fish, Wildlife, and Parks

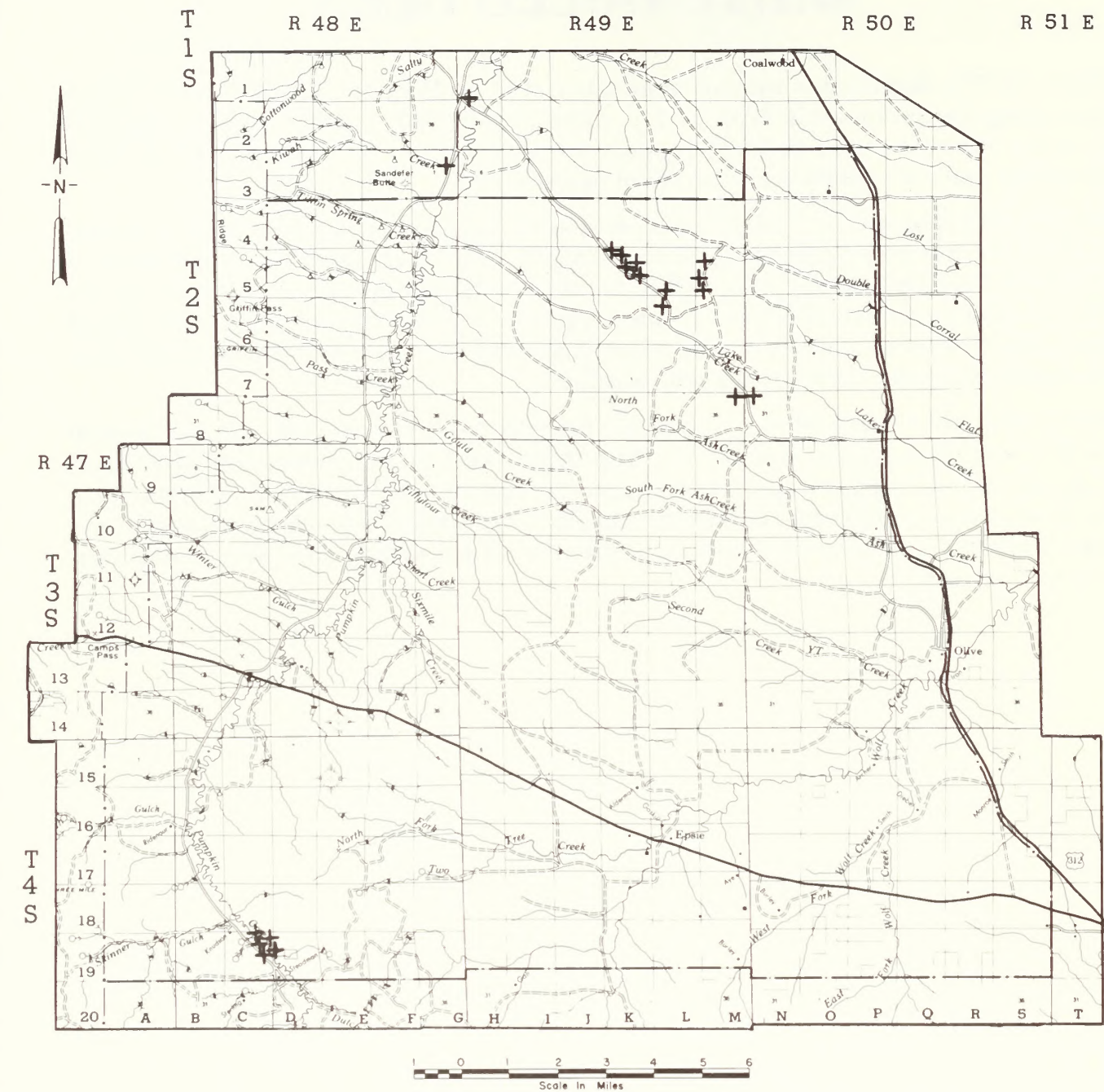
FIGURE 7

WHITE-TAILED DEER

Allen's (1971) distribution map of white-tailed deer in Montana shows no white-tailed deer along the Yellowstone River and its tributaries in 1941, except for a few isolated pockets. Now, the entire drainage system has white-tailed deer (Allen, 1971). White-tailed deer harvest statistics are shown in Appendix G.

Only 22 observations of 67 white-tailed deer were recorded during this study. A breakdown of the 27 individuals which were classified in fall-early winter was as follows: 4 bucks (14.8%), 13 does (48.2%), and 10 fawns (37.0%). Group size ranged from one-13 with an average of 3.0 individuals. On the northern portion of the study area, the largest group size of white-tailed deer recorded was 13; while, the largest group size recorded on the southern portion of the study area was five.

White-tailed deer distribution is shown in Figure 8. For the most part, the distribution clusters around two general areas. On the northern end, most observations were made in approximately the same general area until the spring-summer period. At that time, a few observations were made outside this area and along the creek which indicated some dispersal during this period. On the southern end, all the observations were made in the summer-fall period.



BROADUS—PUMPKIN CREEK WILDLIFE STUDY AREA

WHITE-TAILED DEER OBSERVATIONS ENTIRE STUDY PERIOD

LEGEND:

- Group of 10 or More
- + Group of Less Than 10

FIGURE 8

Habitat utilization for 22 observations was as follows: creek (7), pine (4), sagebrush (4), grassland (4), and agriculture (3). The study area really lacks the proper interspersion of riparian, brushy draws, and agriculture that is characteristic of prime white-tailed deer habitat. In turn, there was a very minimal population of white-tailed deer.

ANTELOPE

POPULATION CHARACTERISTICS

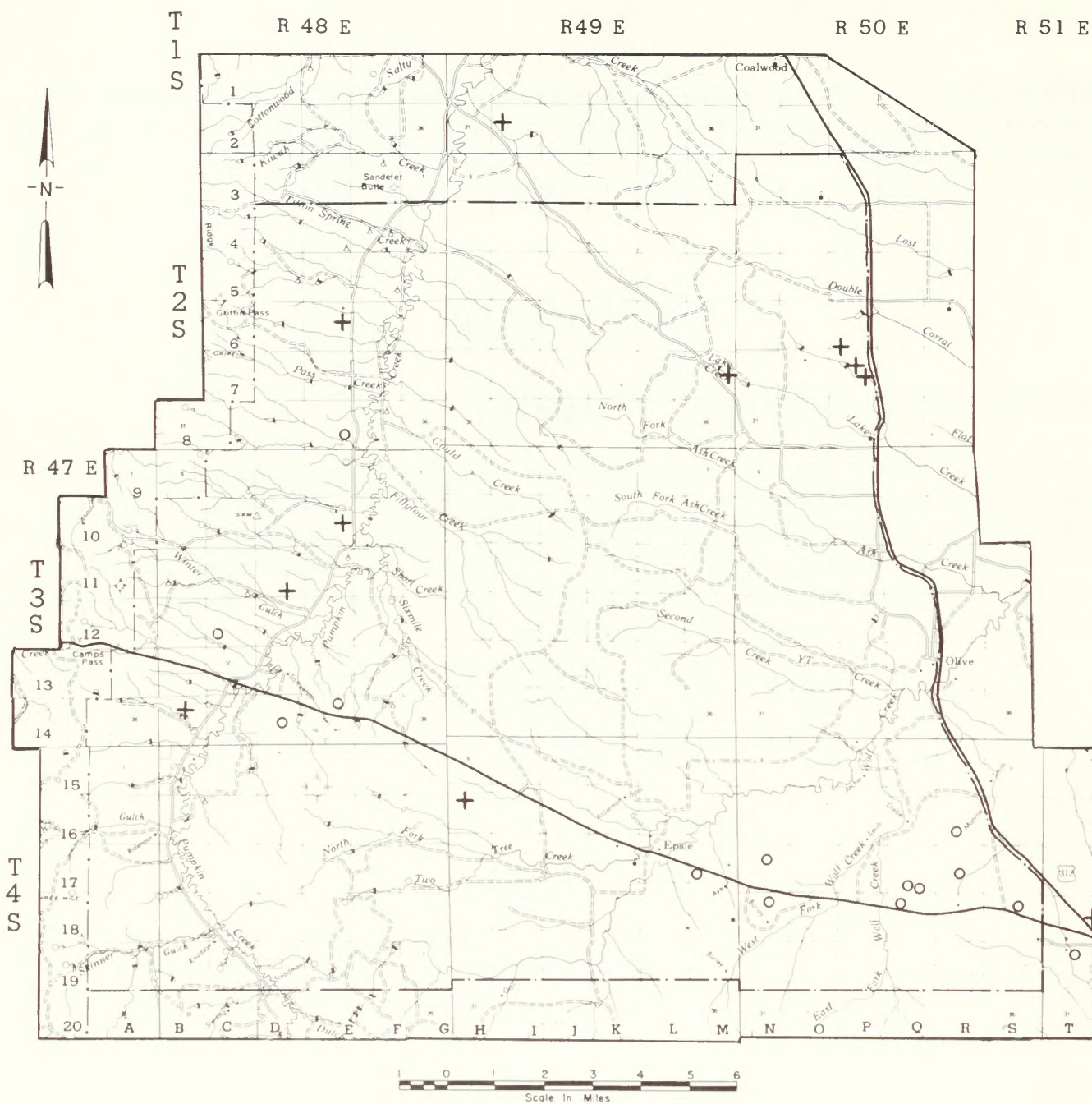
Antelope population characteristics are shown in Table 3 and survey statistics are presented in Appendix H. A total of 381 observations of 2,776 antelope were recorded. Mid-summer — early fall classifications showed 14.0 percent bucks, 58.6 percent does, and 27.4 percent fawns in the area. Fawn production was considerably reduced as compared to Wentland's (1980) figures of 92, 78, and 90 fawns:100 females in 1979 for hunting districts 740, 741, and 792, respectively.

Group size varied from 1-47 individuals (Figures 9-13). For the most part, groups are formed or forming by fall. Most of the winter observations are of groups of 10 or more until spring dispersal. Spring and summer observations are usually of small groups and does with young.

TABLE 3

ANTELOPE POPULATION CHARACTERISTICS

Month	Total	Bucks	Does	Fawns	Fawns	Fawns	Bucks	Population %		
					100 Does	100 Adults	100 Does	Bucks	Does	Fawns
Jul 1980	273	40	148	85	57.4	45.2	27.0	14.6%	54.2%	31.1%
Aug 1980	205	18	118	69	58.5	50.7	15.3	8.8%	57.6%	33.7%
Sep 1980	424	58	265	101	38.1	31.3	21.9	13.6%	62.5%	23.8%
Oct 1980	71	20	39	12	30.8	20.3	51.3	28.2%	54.9%	16.9%
Total	973	136	570	267	46.8	37.8	23.9	14.0%	58.6%	27.4%

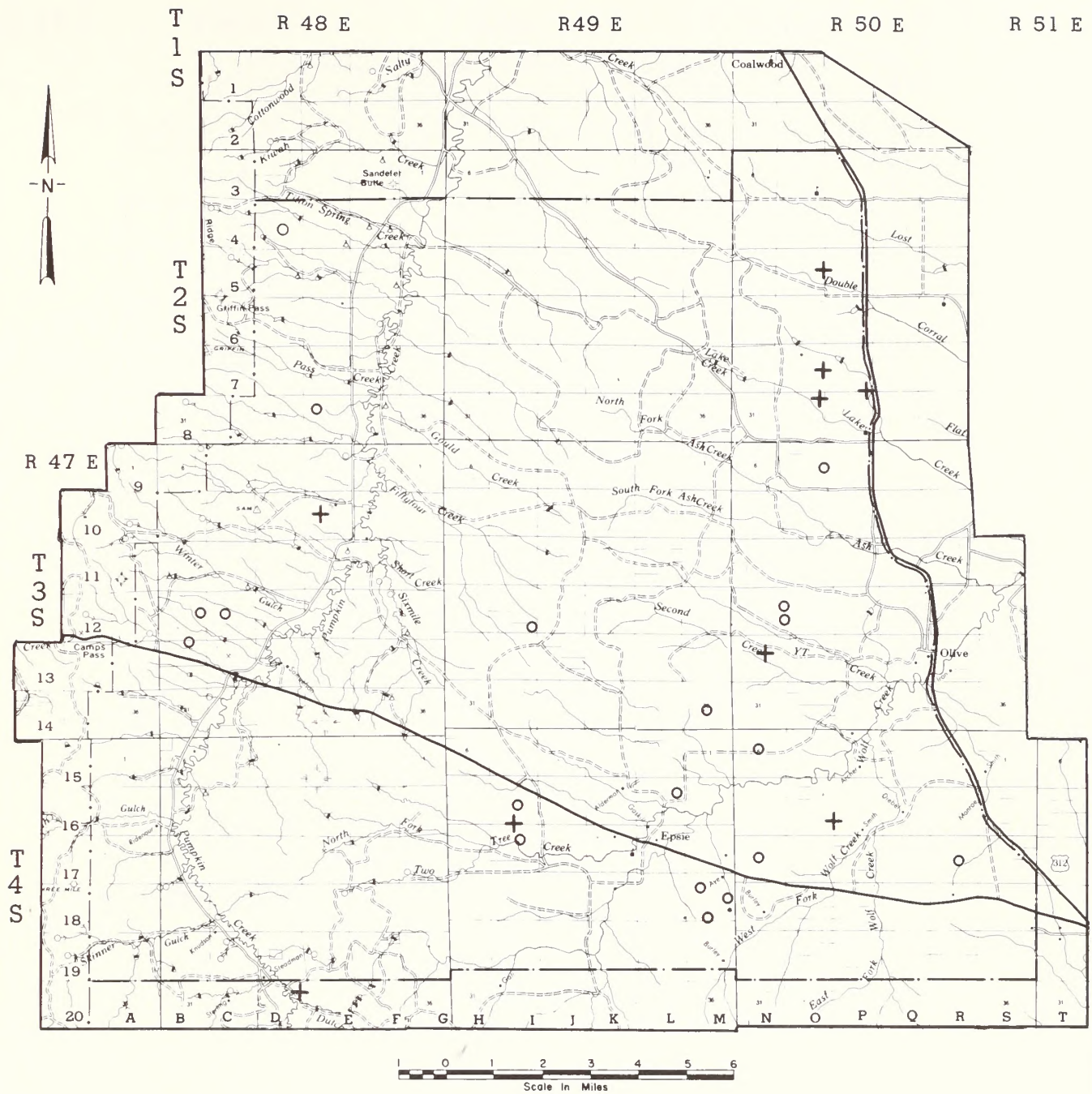


BROADUS—PUMPKIN CREEK WILDLIFE STUDY AREA

**ANTELOPE OBSERVATIONS FOR
OCTOBER, NOVEMBER, DECEMBER 1979**

LEGEND:
Group of 10 or More
Group of Less Than 10

FIGURE 9

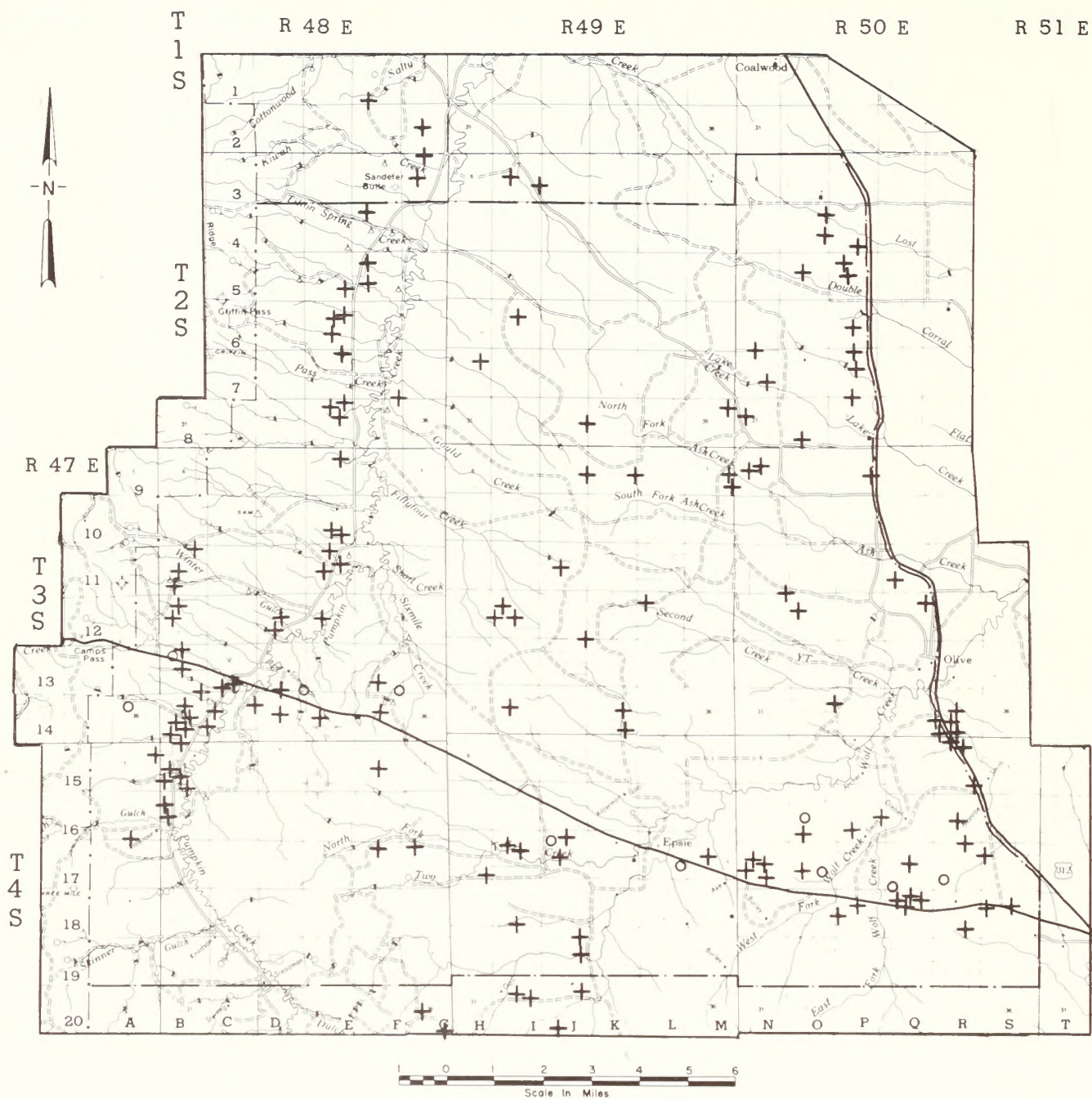


BROADUS—PUMPKIN CREEK WILDLIFE STUDY AREA

**ANTELOPE OBSERVATIONS FOR
JANUARY, FEBRUARY, MARCH 1980**

- LEGEND:**
- Group of 10 or More
 - + Group of Less Than 10

FIGURE 10



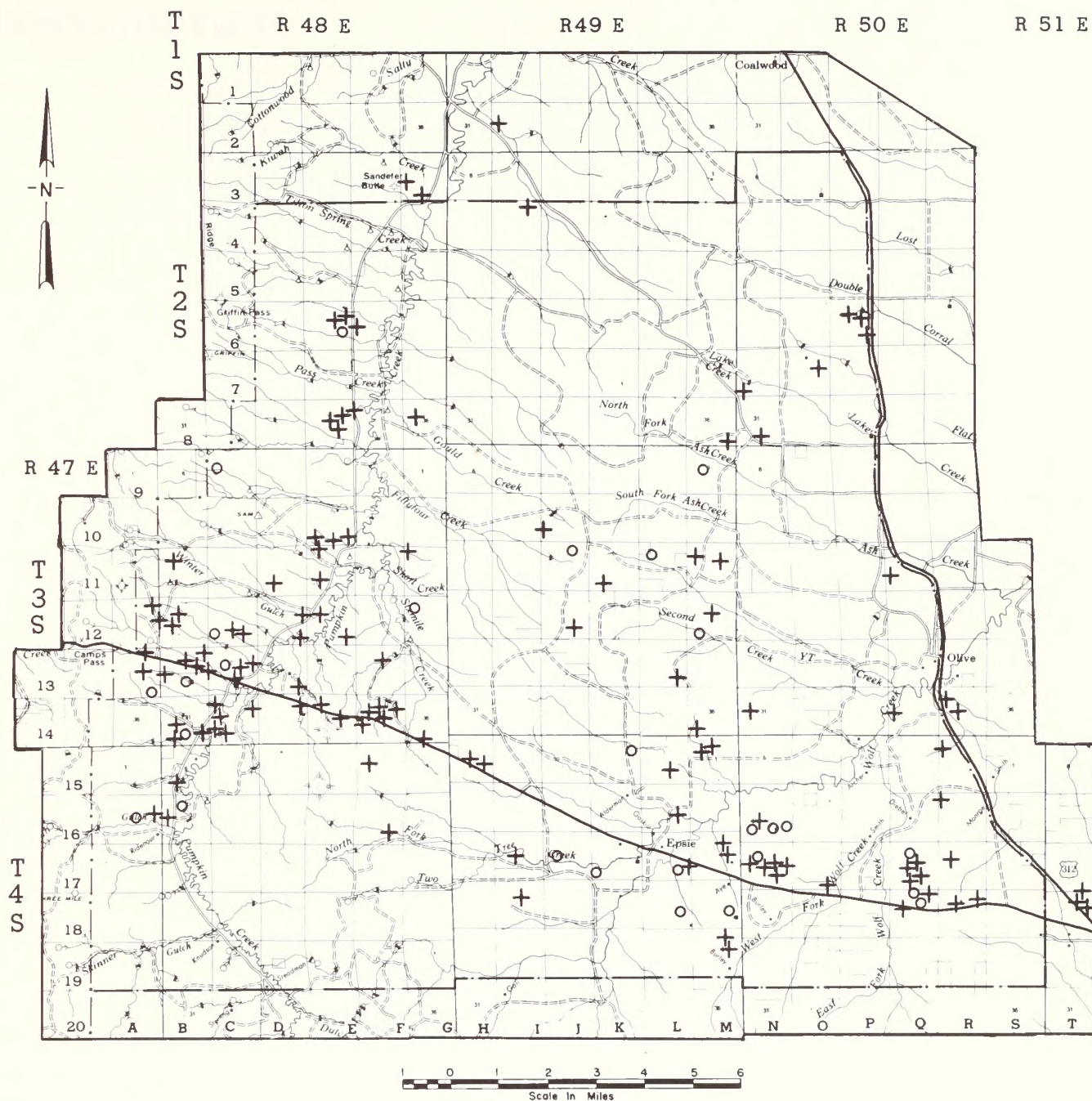
BROADUS—PUMPKIN CREEK WILDLIFE STUDY AREA

**ANTELOPE OBSERVATIONS FOR
APRIL, MAY, JUNE 1980**

LEGEND:

- Group of 10 or More
- + Group of Less Than 10

FIGURE 11



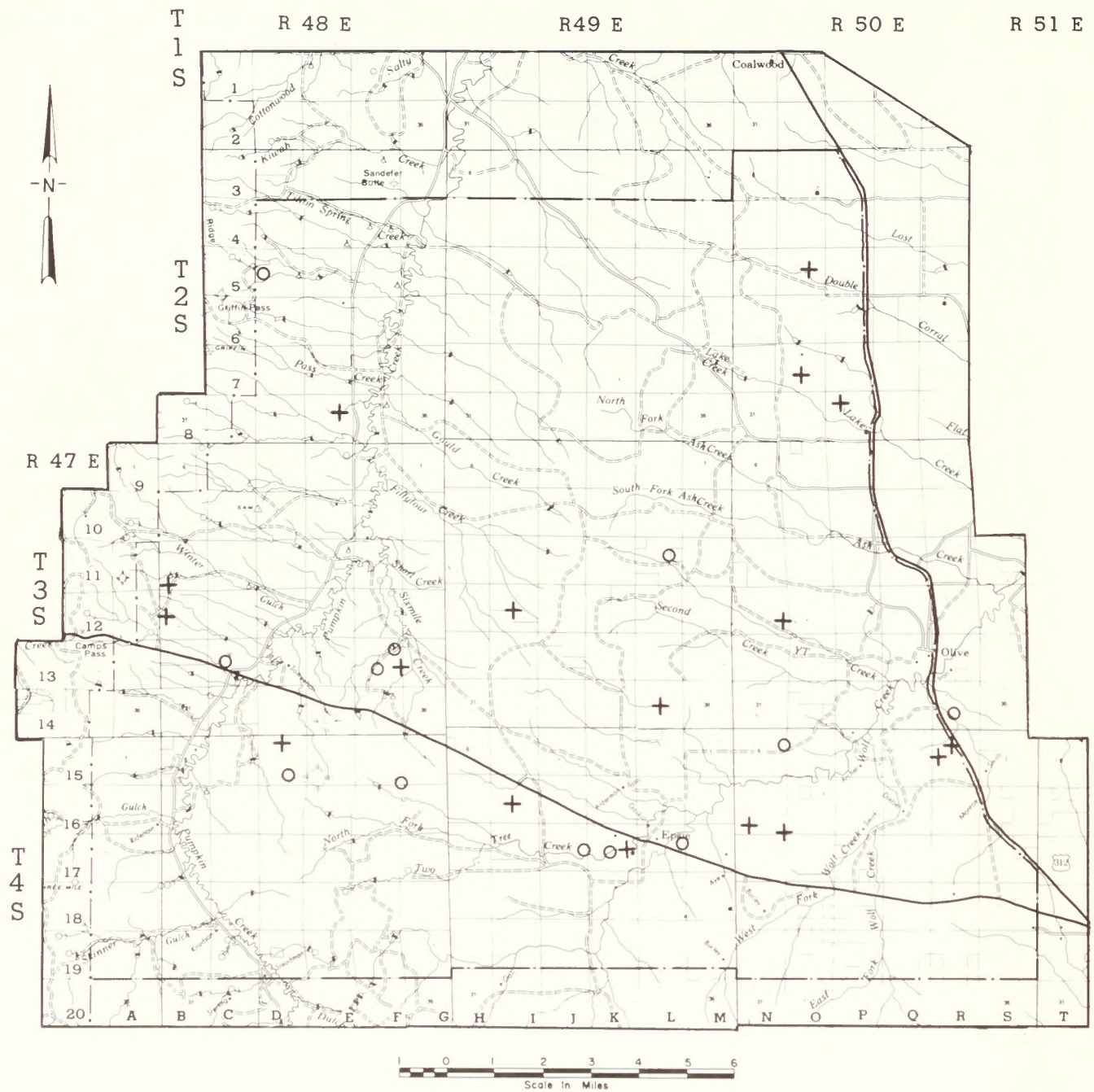
BROADUS—PUMPKIN CREEK WILDLIFE STUDY AREA

ANTELOPE OBSERVATIONS FOR
JULY, AUGUST, SEPTEMBER 1980

LEGEND:

- Group of 10 or More
- ⊕ Group of Less Than 10

FIGURE 12



BROADUS—PUMPKIN CREEK WILDLIFE STUDY AREA

ANTELOPE OBSERVATIONS FOR
OCTOBER, NOVEMBER, DECEMBER 1980

LEGEND:

- Group of 10 or More
- + Group of Less Than 10

FIGURE 13

DISTRIBUTION

Seasonal antelope distribution is shown in Figures 9-13. Fall 1979 distribution shows approximately eight groups on the area. Winter distribution is similar except two new groups appear, one west of Olive and one north of Epsie. Spring and summer distribution shows the antelope were very widespread and scattered. By fall 1980, the distribution coincides very closely to distribution of the previous fall-winter period.

HABITAT UTILIZATION

The three major habitats selected by antelope were grassland, sagebrush, and agriculture in descending order of utilization. A few observations were made in creek and pine habitats, but they were of little or no significance.

SAGE GROUSE

The location of eight sage grouse strutting grounds is shown in Figure 14. Maximum counts and exact locations are presented in Table 4. Three grounds were classified as "satellite grounds", based on their proximity to other strutting grounds and their utilization. These "satellite grounds" were used during the first portion of the breeding season but were abandoned as the season progressed. Therefore, only the four larger strutting grounds were used for data computation. Maximum counts for the four strutting grounds were 20, 20, 26, and 36 males in attendance for an average of 25.5 males. The small strutting ground somewhat south of the study area was not added to this figure.

Five broods recorded in mid-July to August ranged from 1-6 young with an average of 4.4 young/brood. Wallestad (1975) found that 3.6 juveniles/adult hen in September was necessary to maintain a stable population.

As expected, most of the sage grouse observations (31 of 48) were made in sagebrush habitat as sage grouse are dependent upon sagebrush for food and cover. Many of the observations were made at or near strutting grounds. Likewise, this is not surprising as Wallestad and Schaldweiler (1974) pointed out that the "strutting grounds are the key activity areas within wintering-nesting complexes and are usually the only recognizable part of these complexes." Therefore, these four strutting grounds and the adjacent sagebrush should be considered crucial habitat for sage grouse in this area. The remainder of the observations were made in grassland (14), creek (2), agriculture (1), and combinations of the habitats.

TABLE 4
SAGE GROUSE STRUTTING GROUNDS AND
NUMBER OF MALES OBSERVED

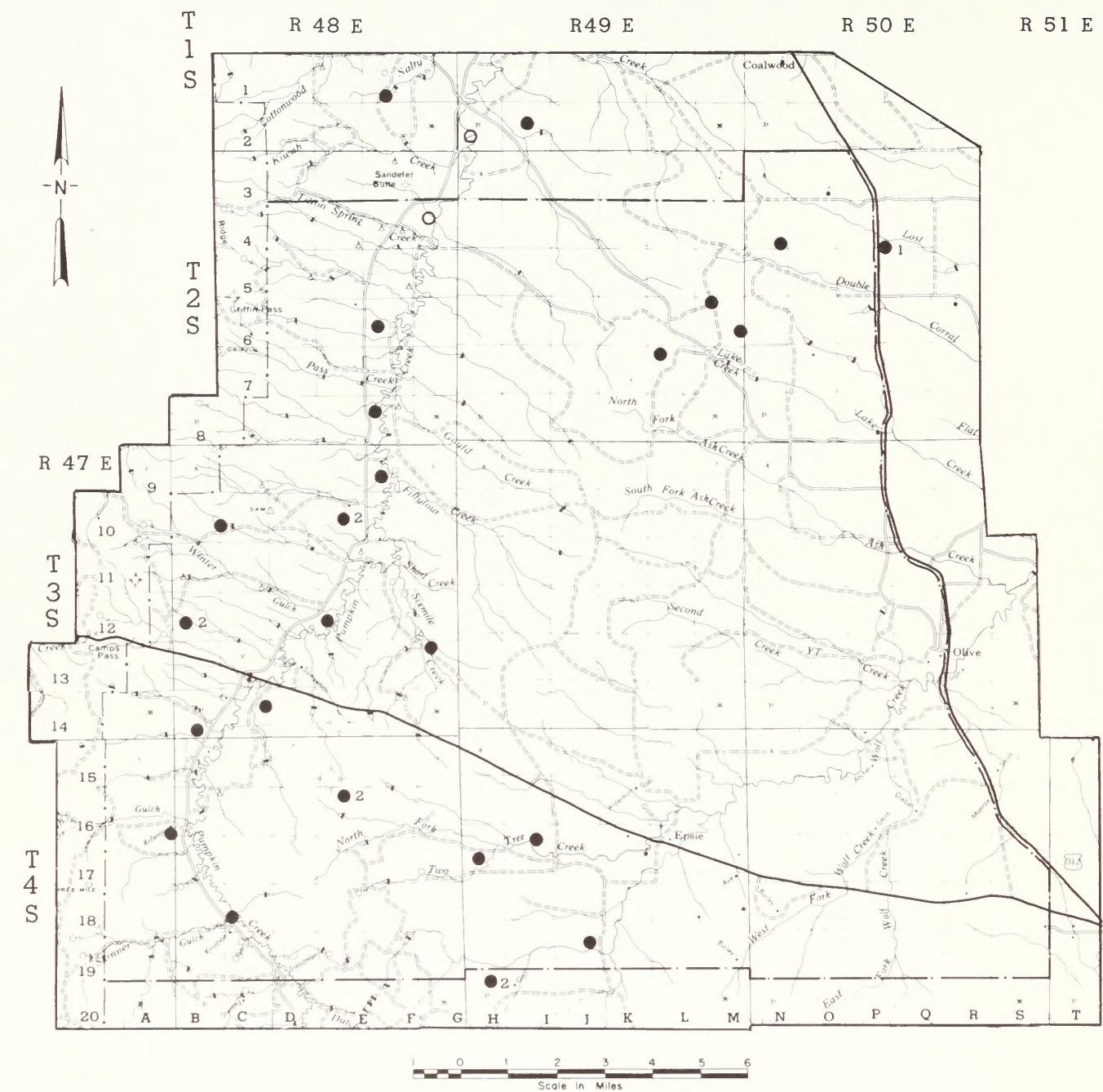
GROUND	LOCATION	MAXIMUM COUNT OF MALES(a)
1	T1S, R48E, Sec. 36 middle	20
2(b)	T3S, R48E, Sec. 15 middle	5
3(b)	T3S, R48E, Sec. 34 NE1/4	3
4	T3S, R48E, Sec. 3 NE1/4	26
5(b)	T1S, R49E, Sec. 32 middle	4
6	T3S, R48E, Sec. 25 middle	36
7(c)	T3S, R49E, Sec. 16	20
8(c)	T4S, R50E, Sec. 32 NE1/4	5

- a — Maximum count as derived from two or more visits.
- b — Possible "satellite" ground. (See comments in text.)
- c — Montana Department of Fish, Wildlife, and Parks Files

SHARP-TAILED GROUSE

Locations of 26 sharp-tailed grouse strutting grounds (leks) are shown in Figure 15. Maximum counts of males attending these leks are given in Table 5. The smallest strutting ground had five males; the largest had 33 males. Two leks were not located precisely as we were denied access to this private land. Two attempts to locate these leks by airplane failed. These two strutting grounds were believed to be relatively small based on the sounds of lekking males on the ground. Other strutting grounds probably also exist in the area but were not located. Therefore, population characteristic estimates are minimal. Total male population for 24 strutting grounds was 454 and averaged 18.9 males per strutting ground. This is slightly above Martin's (1980) average of 17.8 males per strutting ground and well above the Region 7 average (16 males per strutting ground) reported by Knapp and Swenson (1980).

If a 50:50 sex ratio is assumed and Robel's, et al. (1972) technique using a maximum total count of males is used to compute population estimates, there were a minimum of 908 sharp-tailed grouse in the area during spring 1980. If Rippin and Boag's (1974) technique of assuming that 50 percent of the males are non-territorial is used, the estimate was 1,816 sharptailed grouse.



BROADUS—PUMPKIN CREEK WILDLIFE STUDY AREA

SHARP-TAILED GROUSE

STRUTTING GROUNDS

LEGEND:

- Known Ground
- 1 Possible "Satellite" Ground
- 2 Montana Department of Fish, Wildlife, and Parks Files
- Unsure of Location (see text)

FIGURE 15

TABLE 5
SHARP-TAILED GROUSE STRUTTING GROUNDS
AND NUMBER OF MALES OBSERVED

GROUND	LOCATION	MAXIMUM COUNT OF MALES(a)
1	T4S, R48E, Sec. 6 NW1/4	26
2	T4S, R47E, Sec.12 SE1/4	20
3	T2S, R48E, Sec.23 middle	12
4	T4S, R49E, Sec.28 E1/2	19
5	T2S, R48E, Sec.35 middle	14
6	T2S, R49E, Sec.24 NW1/4	23
7	T4S, R49E, Sec.18 middle	20
8	T1S, R49E, Sec.32 middle	32
9	T2S, R49E, Sec.24 E1/2	25
10	T2S, R50E, Sec. 7 SE1/4	18
11	T3S, R48E, Sec.24 SW1/4	21
12	T3S, R48E, Sec. 7 SE1/4	17
13	T4S, R49E, Sec.17 NE1/4	21
14	T3S, R48E, Sec. 2 NE1/4	19
15	T4S, R48E, Sec.19 NE1/4	15
16	T2S, R49E, Sec.26 NW1/4	33
17(b)	T2S, R50E, Sec. 9 SW1/4	5
18	T1S, R48E, Sec.26 S1/2	16
19	T3S, R48E, Sec.22 middle	13
20	T3S, R48E, Sec. 2 middle	15
21(c)	T1S, R49E, Sec.31	
22(c)	T2S, R48E, Sec.11	
23(d)	T3S, R48E, Sec.10 W1/2	8
24(d)	T3S, R48E, Sec.19	30
25(d)	T4S, R48E, Sec.10 NE1/4	23
26(d)	T4S, R49E, Sec.31 NE1/4	9

a — Maximum count as derived from two or more visits.

b — Possible "satellite" ground. (See comments in text.)

c — Actual location unknown as I was denied access to this private land.

d — Montana Department of Fish, Wildlife, and Parks Files.

Only two broods, a brood of one and a brood of two, were observed. Considering the 6.6 young/brood average (Knapp and Swenson, 1980), reproduction appeared to be extremely poor this past year, probably attributable to the drought. During a drought, there is a corresponding reduction in cover. Plants lack the necessary moisture for "green-up" and growth. This, coupled with increased grazing pressure because of low market prices for cattle and limited forage, probably resulted in a poor year for sharp-tailed grouse. Habitat utilization showed that grasslands, creek, agriculture, and sagebrush were important in decreasing order of utilization. This was probably biased somewhat because of counts of sharp-tailed grouse on the strutting grounds which were usually in grassland, although several were found in agriculture and sagebrush. However, habitat utilization still shows the importance of creek habitat for cover and agriculture for food.

RING-NECKED PHEASANT

Ring-necked pheasants varied from abundant to uncommon on the different portions of the study area. Exact locations of the two pheasant crowing routes are shown in Appendix C. The western route along Pumpkin Creek averaged 7.6 crows per stop; whereas, the eastern route along U.S. Highway 312 averaged 1.9 crows per stop. Montana Fish, Wildlife, and Parks also has a pheasant crowing count survey on Pumpkin Creek from U.S. Highway 212 down the creek. Crows/stop averaged 11.0, 4.9, and 9.1 crows per stop for 1978, 1979, and 1980, respectively (Knapp and Swenson, 1980). For the western route, the greatest density occurred south of U.S. Highway 212 to the southern boundary of the study area. North of the Highway 212, ring-necked pheasants declined somewhat in numbers until the northern portion of this route where they began to increase. On the eastern route along U.S. Highway 312, ring-necked pheasants were seen and heard most often around homesites with shelter belts or brushy creek bottoms with grain fields nearby.

Size for seven ring-necked pheasant broods ranged from 3-14 individuals with an average of 6.0 individuals. This is slightly below the 6.5 young/brood in Region 7 for 1970-1979 reported by Montana Fish, Wildlife, and Parks (Knapp and Swenson, 1980).

Year-round habitat utilization was as follows: creek (169 observations), agriculture (45 observations), grassland (45 observations), sagebrush (17 observations), homesites (3 observations), pine (2 observations), plus a few observations involving combinations of these habitats. For the most part, ring-necked pheasants utilized the creek for nesting and cover and moved into the small-grain fields adjacent to the creek to feed.

GRAY PARTRIDGE

Trueblood and Weigand (1971) found the gray partridge or Hun most abundant in the northeastern and northcentral counties of Montana. Only a few scattered observations of Huns were made during this study, and then, the coveys were relatively small (4.2 birds average). Martin (1980) saw no Huns on the Otter Creek study area in Powder River County. Apparently, these portions of Powder River County do not have the proper mixture of cultivated and non-cultivated land that Huns need. Consequently, only a few small scattered flocks of Huns exist there.

MERRIAM'S TURKEY

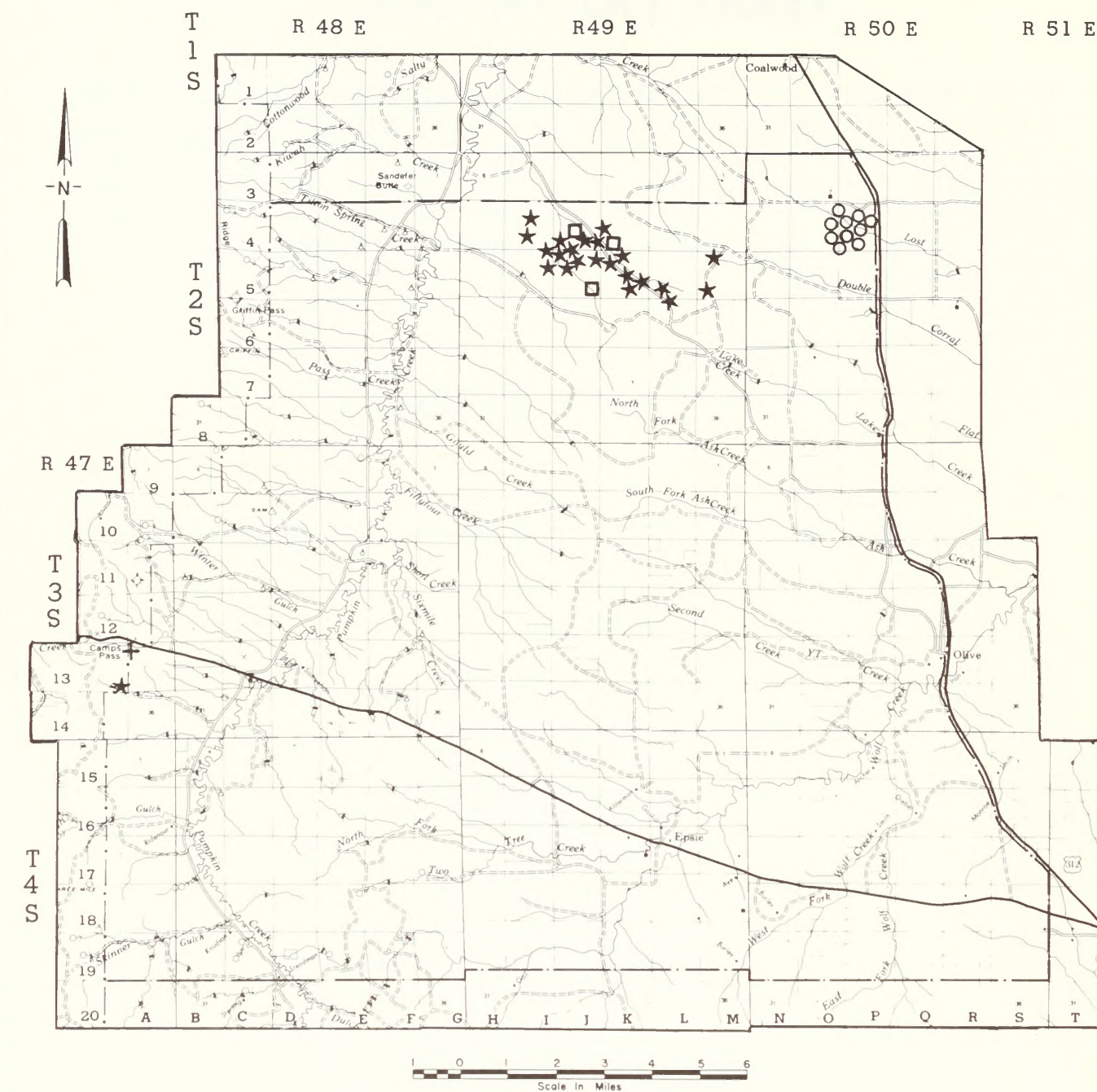
According to Greene and Ellis (1971), historical records indicate that wild turkeys were probably not native to Montana. In 1954, Montana Department of Fish and Game began a transplant program and in October 1956 and January 1957, 26 turkeys were released near Ashland; however, they have flourished since then and are now distributed over most of Powder River County (Greene and Ellis, 1971).

Thirty-eight observations of turkeys were made; however, only a few observations were classified to sex, so no attempt was made to determine population structure. Group size ranged from 1-161 individuals (Figure 16). During the fall-winter months, a group of six individuals near the Custer National Forest was the smallest group. Most of the observations during this period were from a large flock (100+ turkeys) that wintered along Lost Soldier Creek. Observations during the spring-summer period were of small groups or singles, although a few groups of 10+ individuals were observed shortly after the initial dispersal period.

Three hens with broods of six poults each were observed. Jonas (1964) observed an annual mortality of 50 percent or more of the turkey population in the Long Pines area, whether the population was hunted or not. To sustain this type of mortality, it requires good nesting success to maintain a stable population in the area. Turkey harvest statistics for Powder River County are shown in Appendix I.

Turkey distribution is shown in Figure 16. All the winter observations cluster along Lost Soldier Creek, except one observation near Custer National Forest. This area was believed to winter not only turkeys from the study area but, also some turkeys from Custer National Forest. This area along Lost Soldier Creek was a critical area for turkeys. However, if the landowner changes his present agricultural practices, e.g., converts his small-grain fields to pasture or alfalfa, the turkeys will probably relocate. The turkeys did not move to this area this past year until late January 1981, and then, only a small flock of 20+ turkeys was seen. This was probably a direct reflection of the unusually mild winter.

During the winter, the turkeys utilized the creek and pine habitat for roosting and cover and the small-grain fields for feeding. Oftentimes, they were observed at the landowners homesite. During the spring-summer period, the turkeys used the pine habitat for nesting, roosting, and cover and moved into the creek, sagebrush, and grassland



BROADUS—PUMPKIN CREEK WILDLIFE STUDY AREA

FIGURE 16

pastures for feeding. These open areas were probably used for “bugging areas” to catch grasshoppers because young poults need a high protein diet during this period. In addition, turkeys were known to utilize the following two watering holes in the area: a spring in the SW1/4 of Sec. 10 T2S-R49E, and the creek in the NW1/4 of Sec. 15 T2S-R49E.

RAPTORS

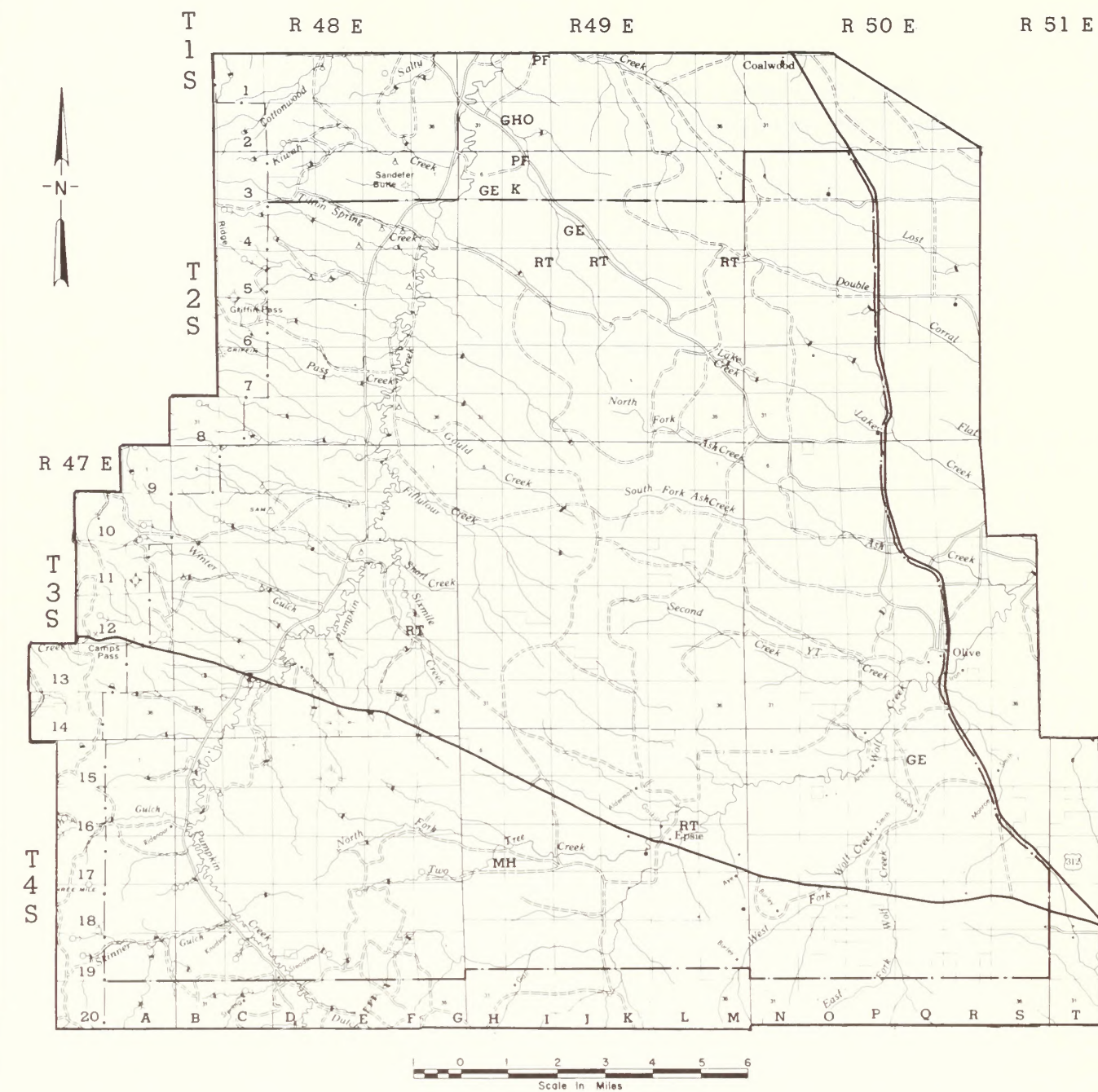
Thirteen species of raptors were identified on the study area (Table 7), including four hawk, two eagle, one harrier, three falcon, and three owl species. General locations of raptor nests are presented in Figure 17 and Appendix J presents a more detailed description of the nests’ locations and their status. Many raptors are afforded special status by the state of Montana and/or federal government, i.e., Montana “special concern” species, federally threatened or endangered, or migratory bird of high federal interest. Because of this, each raptor species is discussed separately below.

Red-tailed Hawk — Red-tailed hawks were a common breeding buteo on the area and five active nests were located. Nests were located in the creek habitat, usually in a large cottonwood, or in the pine habitat in large ponderosa pines. Nests in the pine habitat were extremely difficult to locate. Additional nests were undoubtedly located in the pine habitat as evidenced by several territorial pairs noted there during the breeding season (Appendix K), but attempts to locate their nests were unsuccessful. For the most part, red-tailed hawks utilized the creek and pine habitats for nesting and perching and hunted the more open habitats such as agriculture, grassland, and sagebrush. Although they are known to winter in some adjacent latilongs (Skaar, 1980), the majority of the population migrated in the fall and rough-legged hawks filled their niche during the winter months.

Swainson’s Hawk — This buteo was relatively uncommon on the area, and although several observations were made during the breeding season, no nests were located. It was classified as a possible breeding raptor based on our observations and Skaar’s (1980) classification as a suspected breeding bird for the latilong. Most observations were made in grassland habitats.

Rough-legged Hawk — This was the common wintering buteo on the area. As stated previously, the rough-legged hawks seemingly occupies the same habitats as the red-tailed hawk, except it fills this niche during the winter months after red-tailed hawks migrate south for the winter. Creek and pine habitats were used for perching and the more open habitats were utilized for hunting.

Ferruginous Hawk — Ferruginous hawks are classified as a migratory species of high federal interest and as a “special concern” species for the state of Montana. No nests were located during the study; however, several observations were made during the breeding season. Presently, there is an active BLM file with locations of approximately 45



BROADUS—PUMPKIN CREEK WILDLIFE STUDY AREA

RAPTOR NEST LOCATIONS

LEGEND:

RT — Red-tailed Hawk

GE — Golden Eagle

PF — Prairie Falcon

MH — Marsh Hawk

K — Kestrel

GHO — Great-horned Owl

FIGURE 17

active ferruginous hawk nest sites in nearby Carter County. Based on this, Skaar's (1980) classification, and observations recorded during this study, it was classified as a possible breeding raptor for the area.

Golden Eagle — Golden eagles are classified as a migratory species of high federal interest and as a Montana "special concern" species. They were relatively common on the area, both wintering and nesting there. Three active nests were located in the pine habitat. The nests were in large ponderosa pines and all three nests produced young. Approximate locations of two additional nests are given (Appendix K). The status of these other nests is questionable as one nest was not located and the other nest was on private land that we were denied access to. Golden eagles preferred the more open habitats (sagebrush, grassland) for hunting and pine habitat for nesting. They were often observed perched on scoria buttes and cliffs during the day.

Bald Eagle — Bald eagles are a federal endangered species. Only a few observations were actually made on the area. These observations were made in winter and, in most cases, involved adult birds feeding on deer carcasses (carrion). Swenson, et al. (In Prep.) found that bald eagles wintering in southeastern Montana were often observed feeding on antelope carcasses (carrion). Observations in this study were most likely casual observations of bald eagles that were wintering on the nearby Tongue or Powder River, rather than being observations of bald eagles wintering on the area, itself. Swenson, et al. (In Prep.) suggested that bald eagles wintering along smaller rivers utilized terrestrial food sources when the rivers were frozen, and this was probably the situation here.

Marsh Hawk — The marsh hawk or harrier is normally a common raptor for southeastern Montana. Although there were 78 observations during this study, there appeared to be a considerable decline in numbers after spring migration. Dood (1980) noticed similar results and attributed the decline in numbers to the severe drought in his area. One nest with five eggs was located in a patch of snowberry; however, it was unsuccessful. Marsh hawks were usually observed hunting over agriculture and grassland habitat.

Prairie Falcon — The prairie falcon, a federal migratory species of high federal interest and a "special concern" species for Montana, was a relatively common raptor on the study area. Two active aeries were located, one in a limestone outcropping and the other in a sandstone outcropping. In addition, another territorial pair was observed on the southern portion of the study area, but an active aerie was not found (Appendix K). Several limestone outcroppings in this area were covered with whitewash and possibly were used in previous years but were inactive this past year. For the most part, prairie falcons hunted the more open habitats such as grassland, agriculture, and sagebrush, and perched on telephone poles, trees, etcetera nearby.

Merlin — The merlin is another falcon that is both a migratory species of high federal interest and a Montana species of "special concern". Only two observations of merlins were made during the study, one observation during the breeding season and one observation during the fall. Based on these observations, it is doubtful that any merlins nested on the study area, even though the potential exists. Becker (1980) and Youmans (pers. comm.) found merlins in southeastern Montana utilizing old magpie nests on ponderosa pine slopes overlooking adjacent prairies. The Becker study was in nearby

Carter County, while Youmans' study was located in Powder River County on Sand Creek, approximately 15-20 miles from this study area, so the potential for merlins nesting on this study area definitely exists.

American Kestrel — Kestrels were the most abundant raptor on the area. No effort was made to locate their nests because they were so common and were not a special status species, but one nest was located in a woodpecker hole in a dead ponderosa pine. Most observations were made in the open habitats where they often perched on telephone poles or hovered while hunting.

Great Horned Owl — Great horned owls were a common resident species, nesting and wintering on the area. Only one nest was located in an old cottonwood, although many other nests were, undoubtedly, there. Again, no special effort was made to locate their nests. Numerous observations were made of road-killed birds near open habitats such as sagebrush and grassland which indicated that these areas were utilized for hunting at night; whereas, day observations were usually made in creek and pine habitat.

Burrowing owl — The burrowing owl is a migratory species of high federal interest and Flath (1981) listed them as a "special concern" species in Montana. Only one observation was made during this study so it was unlikely that they nested there. In addition, their nesting habitat is usually restricted to active prairie dog towns and there were no active prairie dog towns on the study area.

Short-eared Owl — Short-eared owls are a fairly common raptor in grassland and sagebrush habitats in some parts of southeastern Montana; however, this was not the case here as only one observation was made during this study. Dood (1980) noticed a similar result on his study area which he explained as a direct reflection of the drought conditions. Under normal conditions short-eared owls are probably more common in the area but drought conditions may directly influence their abundance. Therefore, they were classified as an uncommon species for the study area.

Several special status raptors were missed during this study (Cooper's hawk, osprey, sharp-skinned hawk, goshawk, and peregrine falcon), but they were observed in several studies nearby (Martin, 1980 and Martin, et al. 1980). These species probably also migrate through this area, but were simply overlooked or missed because they are quite rare. In addition, several inconspicuous owl species such as screech owls and saw-whet owls were suspected of occurring there; even though, they were not observed.

GREBES, HERONS, AND WATERFOWL

Grebes, herons, and waterfowl identified on the study area are listed in Table 7. The study area is somewhat west of the major migration corridor used by waterfowl in the Central Flyway as shown by Bellrose (1968). Even so, waterfowl utilization was considerably below expectations. The only wetland habitats of importance were Pumpkin Creek,

Mizpah Creek, and the reservoirs. As a result of the severe drought this past year, large stretches of these creeks and many of the smaller reservoirs dried up as summer progressed.

The only grebes found on the area were eared grebes and pied-billed grebes. Eared grebes were observed once at a large reservoir. However, this was expected as most grebes, except the pied-billed grebe, prefer larger bodies of water. Pied-billed grebes were fairly common in the creeks and reservoirs and nested successfully on the area. Pied-billed grebes prefer shallow fresh water, and all the wetlands on the area were quite small and shallow. Great blue herons were observed mainly in the creeks but no rookeries were found.

Fifteen species of waterfowl were identified. Most of the waterfowl were dabbling ducks, although a few diving ducks were observed during migration. Mallards and blue-winged teal nested on the area, although other dabbling duck species were also suspected of nesting there. As expected, the mallard was the most common species of waterfowl followed by green-winged teals, blue-winged teals, pintails, wigeons, gadwalls, and shovelers, in decreasing order of abundance. Although a few diving duck species were observed, there were only a few observations and then they were restricted to the larger reservoirs. The study area really lacks the larger bodies of deep water needed by diving ducks. Consequently, there were very few observations of diving ducks. Lesser scaup and redheads were the more common species of diving ducks although they were uncommon on the area. Another diving duck, the canvasback, is a migratory species of high federal interest but none were seen during this study.

SHOREBIRDS AND OTHER WETLAND BIRDS

Sixteen species of cranes, rails, shorebirds, and gulls were identified (Table 7). One flock of sandhill cranes, a migratory species of high federal interest, was observed during migration; however, the study area is a considerable distance west of the major migration corridor as shown by Lewis (1977). No whooping cranes (*Grus americana*) were observed. One observation of a sora was made which would indicate that it is a rare species, but this is not the case. Actually, the sora is one of the more common rails, but it is seldom seen because of its highly secretive nature (Robbins, et al, 1966, and Seabloom, et al, 1978). Coots were quite common and nested successfully on the area. The only gull seen on the area was the ring-billed gull, which was recorded only once. For the most part, shorebirds as a group were uncommon and most were observed during migration. Killdeer were the only shorebirds that nested there, but other species such as Wilson's phalaropes and upland sandpipers were suspected of also nesting there. Three species of shorebirds are special status species. The upland sandpiper is a "special concern" species for Montana. It was observed several times and suspected of nesting on

the area. Mountain plovers are a migratory species of high federal interest; however, none were observed. It should be noted that there were no prairie dog towns on the study area which are essential habitat for mountain plovers. Finally, the long-billed curlew is a migratory species of high federal interest and a "special concern" species for Montana. Although several observations of long-billed curlews were made, no nests were found.

FURBEARERS AND PREDATORS

Furbearers and predators normally harvested for their pelts are listed in Table 12. Mink, muskrat, and beaver were aquatic furbearers on the area. One mink, a road-kill, was observed near Mizpah Creek. Beaver sign was observed along Mizpah Creek and Pumpkin Creek but it was not very abundant. Muskrats were found in practically all creeks and reservoirs, and on two occasions were observed in grassland and sagebrush, quite a distance from any water source. Errington (1961) noted that muskrats were often observed considerable distances from water when they were undergoing stress conditions such as overcrowding, disease, drought etcetera. As mentioned previously, most creeks and many reservoirs dried up during the drought. The only other "classified" furbearer in the area was the bobcat. Only one was observed but bobcats are usually secretive and nocturnal.

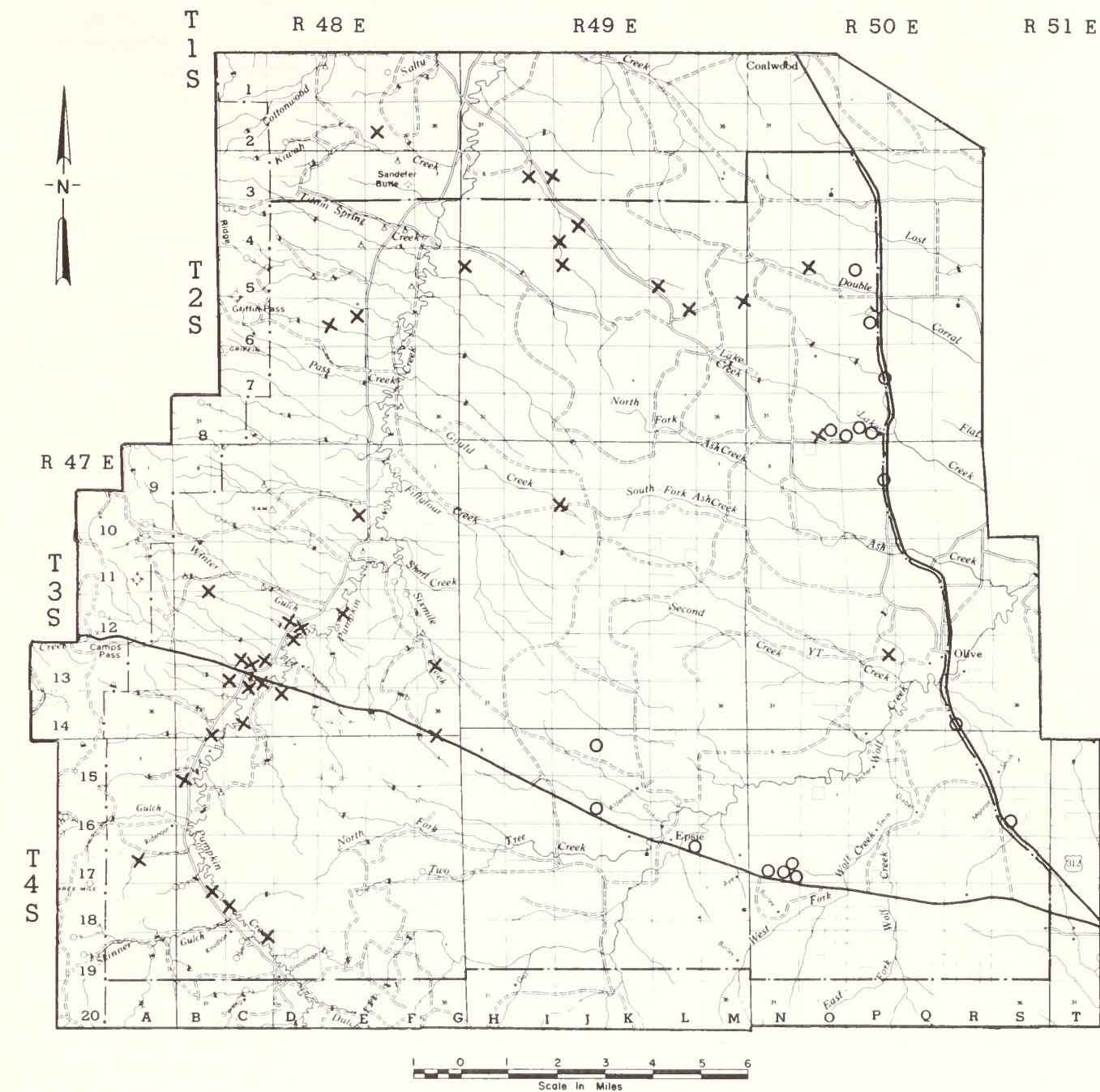
Other species normally harvested for pelts are the coyote, fox, badger, raccoon, skunk, and weasels. Coyote and fox observations are shown in Figure 18. Coyote observations were scattered over most of the area; whereas, fox observations were more restricted to two general areas. One fox den with several pups was located. Skunks were quite common and because of its nocturnal and slow-moving habits, many were observed as road kills. Raccoons were seen most often along Pumpkin Creek. Only a few badger and weasel observations were made.

As a group, these mammals are extremely important and most landowners trap or allow others to trap these species, providing an additional source of income for many of the local residents. Fur harvest for Montana Fish, Wildlife, and Parks Region 7 is shown in Appendix L.

NONGAME

AMPHIBIANS AND REPTILES

Four species of amphibians and eight species of reptiles were recorded on the study area (Table 6). For the most part, these species were relatively common. There were no amphibians of "special concern", but Flath (1981) listed the following four "special



**BROADUS—PUMPKIN CREEK
WILDLIFE STUDY AREA**

**COYOTE AND FOX OBSERVATIONS
ENTIRE STUDY PERIOD**

LEGEND:

- x — Coyote
- o — Fox

FIGURE 18

TABLE 6
AMPHIBIANS AND REPTILES IDENTIFIED ON THE STUDY AREA

SPECIES	SIGHTINGS BY HABITAT	TOTAL SIGHTINGS
Amphibians		
Tiger Salamander <i>Ambystoma tigrinum</i>	See Text Under Amphibians	
Rocky Mountain Toad <i>Bufo woodhousei</i>	1(1) Res 1(1) Creek	2(2)
Northern Chorus Frog <i>Pseudacris triseriata</i>	8(208) Creek	8(208)
Leopard Frog <i>Rana pipiens</i>	4(231) Res 3(37) Creek	7(268)
Reptiles		
Painted Turtle <i>Chrysemys picta</i>	12(293) Res 3(4) Creek	15(297)
Short-horned Lizard <i>Phrynosoma douglassi</i>	1(1) XS	1(1)
Racer <i>Coluber constrictor</i>	9(9) Gr 7(7) XS 2(2) NIWF 1(1) Creek	19(19)
Plains Hognose Snake <i>Heterodon nasicus</i>	2(2) XS 1(1) NIWF	3(3)
Milk Snake <i>Lampropeltis triangulum</i>	See Text Under Reptiles	
Gopher (Bull) Snake <i>Pituophis melanoleucus</i>	13(13) Gr 7(7) XS 4(4) NIWF 2(2) Creek 1(1) Pine	27(27)
Plains Garter Snake <i>Thamnophis radix</i>	3(21) Res 2(2) XS 1(1) Creek 1(1) NIWF	7(25)
Western Rattlesnake <i>Crotalus viridis</i>	3(3) XS 3(3) Gr 1(1) Pine	7(7)

1. Numbers are total number of sightings (total number of individuals sighted).

Creek — Creek Bottom
NIWF — Agriculture Land
XS — Sagebrush

Res — Reservoir
Gr — Grassland

Pine — Ponderosa Pine
Homesite

concern" reptiles for the area: snapping turtle (*Chelydra serpentina*), spiny softshell (*Trionyx spiniferus*), plains hognose snake and milk snake. Both turtles are known to occur in Powder River County (probably the Powder River), but they were not observed on the study area. The plains hognose snake and the milk snake were listed as suspected of occurring in Powder River County. Both of these "special interest or concern" snakes were encountered on the study area. Three road-killed plains hognose snakes were seen and a road-killed milk snake that a rancher preserved in alcohol approximately ten years ago was also recorded. According to Davis and Weeks (1963) and Black (1970), additional amphibians and reptiles that were suspected of occurring on the area but not observed were the following: plains spadefoot (*Scaphiopus bombifrons*), great plains toad (*Bufo cognatus*), western garter snake (*Thamnophis elegans*), and common garter snake (*Thamnophis sirtalis*). Several ranchers noted locations of possible snake dens in the area as follows: T3S, R49E, Sec. 31; T4S, R48E, Sec. 5; T4S, R49E, Sec. 9; T2S, R49E, Sec. 6; and T5S, R49E, Sec. 6.

BIRDS

This section on non-game birds discusses mostly passerines. Specific data on game birds, waterfowl, and raptors was discussed in previous sections. One hundred and twenty-three species of birds were identified on the study area. Data on their status, number of sightings, and habitat utilization are presented in Table 7. Nesting birds found on the study area are listed in Appendix M. Birds afforded special status by the state or federal government are listed in Appendix N.

Bird Routes

Seventy-four species of birds were identified on the two bird routes. Sixty-three species were seen on the southern route; whereas, 57 species were seen on the northern route. Western meadowlarks, mourning doves, vesper sparrows, lark sparrows, red-winged blackbirds, yellow warblers, and horned larks were the more abundant birds on the northern route versus western meadowlarks, red-winged blackbirds, Brewer's blackbirds, lark buntings, mourning doves, and ring-necked pheasants as the more abundant birds on the southern route. Both bird routes showed similar species composition but there were apparent differences in the number of individuals of a particular species between the two routes. This was believed to be a direct reflection of the differences in habitats along each route. The southern route had more sagebrush, grassland, agriculture, and creek; whereas, the northern route had more ponderosa pine. In turn, western meadowlarks and mourning doves were more abundant on southern route than northern route.

The Powderville Breeding Bird Survey Route (U.S. Fish and Wildlife Service) is located nearby (approximately 30 miles northeast). This route was first established in 1968 and has been run eleven times since then, including the past two years when it was run for comparison purposes to this study. Past results for the route are presented in Appendix O. The route extends through an area dominated by sagebrush and grassland habitat;

however, there is some creek and agriculture habitat along the route. The most notable habitat difference is the lack of ponderosa pine habitat along the Powderville route. Even though there are apparent differences for the areas, this information is still quite useful for comparison of the two areas. Differences noted among bird species were the lack of birds normally associated with pine habitat such as nuthatches, red crossbills, pinyon jays, etcetera on the Powderville route. Also, birds normally associated with sagebrush such as Brewer's sparrow, Baird's sparrow, and clay-colored sparrow were more common on the route than the study area.

Transects

In addition to the bird routes, transects were run for each of the major habitats during June — early July. Appendix P shows the reproductive status of birds observed on the transects. A brief summary of the results follows:

Creek

The greatest number of species and individuals as shown by the transects were found in the creek habitat Table 8. Twenty-seven species of birds observed on the transect itself and five additional species observed along the transect border (still creek habitat) gave a total of 32 species for the creek. Creek habitat was very important to non-game birds, especially passerines, for breeding and nesting purposes. Nests were located for the following species: yellow warblers, eastern kingbirds, rufous-sided towhees, northern orioles, mountain bluebirds, and house wrens. Eastern kingbirds, house wrens, American robins, mountain bluebirds, yellow warblers, northern orioles, brewer's blackbirds, and rufous-sided towhees were the more abundant species in creek habitat.

Pine

The pine transect ranked second among the habitats in the number of birds observed (Table 9). Nineteen species, thirteen species on the transect and six species off the transect, were observed in the pines. The mourning dove, western wood pewee, house wren, American robin, red crossbill, and chipping sparrow were the more abundant species. While the pines was important to these species, it was special for some of the unique or unusual species. Some examples were white-breasted nuthatches, red-breasted nuthatches, yellow-rumped warblers, and red crossbills. Nests were located for robins, white-breasted nuthatches, western wood pewees, and lark sparrows.

TABLE 7
BIRDS IDENTIFIED ON THE STUDY AREA

SPECIES	STATUS AND RELATIVE ABUNDANCE	SIGHTINGS BY HABITAT 2	TOTAL SIGHTINGS
Eared Grebe <i>Podiceps nigricollis</i>	M-R	1(1) Res	1(1)
Pied-billed Grebe <i>Podilymbus podiceps</i>	B-U	5(13) Res 2(8) Creek	7(21)
Great Blue Heron <i>Ardea herodias</i>	S-R	2(2) Creek 1(2) Gr	3(4)
Canada Goose <i>Branta canadensis</i>	M-U 1/	2(24) Res 1(38) NIWF 1(10) Pine	4(72)
Mallard <i>Anas platyrhynchos</i>	B-A	103(623) Creek 53(701) Res 3(30) Gr 3(5) NIWF 2(7) Xs 1(2) Pine	165(1368)
Gadwall <i>Anas strepera</i>	b-U	8(33) Res 5(11) Creek	13(44)
Pintail <i>Anas acuta</i>	M-A	12(153) Res 4(20) Creek 1(2) Gr	17(175)
Green-winged Teal <i>Anas crecca</i>	b-A	16(321) Res 8(56) Creek 1(3) Gr	25(380)
Blue-winged Teal <i>Anas discors</i>	B-A	19(62) Creek 10(138) Res 1(7) Gr	30(207)
American Wigeon <i>Anas americana</i>	b-A	14(75) Res 9(26) Creek	23(101)
Northern Shoveler <i>Anas clypeata</i>	M-U	4(20) Res 2(4) Creek 1(4) Gr	7(28)
Redhead <i>Aythya americana</i>	M-U	4(8) Res	4(8)

Ring-necked Duck <i>Aythya collaris</i>	M-R	1(2) Res	1(2)
Lesser Scaup <i>Aythya affinis</i>	M-U	5(23) Res 1(1) Creek	6(24)
Common Goldeneye <i>Bucephala clangula</i>	M-R	1(2) Res	1(2)
Bufflehead <i>Bucephala albeola</i>	M-R	2(5) Res	2(5)
Ruddy Duck <i>Oxyura jamaicensis</i>	M-R	1(1) Res	1(1)
Common Merganser <i>Mergus merganser</i>	M-R	1(2) Creek	1(2)
Red-tailed Hawk <i>Buteo jamaicensis</i>	B-A	37(50) Creek 36(54) Pine 31(36) Gr 23(25) XS 7(8) NIWF 1(1) Res	132(174)
Swainson's Hawk <i>Buteo swainsoni</i>	b-U	9(11) Gr 3(8) Creek 2(2) NIWF 1(2) Pine 1(1) XS	16(19)
Rough-legged Hawk <i>Buteo lagopus</i>	W-C	43(48) Gr 20(22) Creek 9(11) Pine 3(3) NIWF 3(3) XS	78(87)
Ferruginous Hawk <i>Buteo regalis</i>	b-U	8(9) Gr 4(4) Creek 1(2) Creek-Pine 1(1) NIWF 1(1) XS	15(17)
Golden Eagle <i>Aquila chrysaetos</i>	R-C	25(28) Gr 21(31) Pine 11(18) XS 1(2) NIWF 1(1) Creek	59(80)
Bald Eagle <i>Haliaeetus leucocephalus</i>	w-U	2(2) Gr 1(1) Creek 1(1) XS 1(1) Pine 1(1) NIWF	6(6)

Marsh Hawk <i>Circus cyaneus</i>	B-A	43(45) Gr 19(21) NIWF 13(14) Creek 10(13) XS 3(5) Pine 1(2) Gr-XS 1(2) Creek-Gr 1(1) Res	91(103)
Prairie Falcon <i>Falco mexicanus</i>	R-C 1/	21(22) Gr 8(10) XS 5(5) NIWF 4(5) Creek 3(3) Pine	41(45)
Merlin <i>Falco columbarius</i>	b-R	1(1) XS See Pine Transect Table also	1(1)
American Kestrel <i>Falco sparverius</i>	B-A	64(78) Gr 55(72) XS 26(31) Creek 15(17) NIWF 10(14) Pine 1(1) Creek-Pine 1(1) Gr-XS 1(1) NIWF-Gr	173(215)
Sharp-tailed Grouse <i>Pedioecetes phasianellus</i>	R-A	90(980) Gr 24(75) Creek 17(141) NIWF 17(102) XS 2(26) Pine 1(32) Creek-Gr	151(1356)
Sage Grouse <i>Centrocercus urophasianus</i>	R-A	38(354) XS 19(103) Gr 5(67) NIWF 5(10) Creek 1(26) Gr-XS 1(4) NIWF-Gr	69(564)
Ring-necked Pheasant <i>Phasianus colchicus</i>	R-A	171(358) Creek 51(166) NIWF 51(81) Gr 24(37) XS 4(12) Homesite 3(19) Creek-NIWF 2(6) Creek-Gr 2(2) Pine 1(2) Homesite-Gr 1(1) Gr-XS	310(684)

Gray Partridge <i>Perdix perdix</i>	R-U	4(15) NIWF 3(14) Gr	7(29)
Turkey <i>Meleagris gallopavo</i>	R-A	13(95) Pine 6(519) NIWF 6(59) Creek 3(6) Gr 4(5) XS 1(100) Homesite	33(784)
Sandhill Crane <i>Grus canadensis</i>	M-R	1(50) XS	1(50)
Sora <i>Porzana americana</i>	b-R	1(1) Creek	1(1)
American Coot <i>Fulica americana</i>	B-C	20(83) Res 1(2) Creek	21(85)
Wilson's Phalarope <i>Steganopus tricolor</i>	M-U	5(12) Res 1(2) Creek	6(14)
Common Snipe <i>Capella gallinago</i>	M-U	1(13) Res	1(13)
Long-billed Curlew <i>Numenius americanus</i>	b-U	1(3) Gr 1(2) XS	2(5)
Upland Sandpiper <i>Bartramia longicauda</i>	b-U	4(6) XS 1(2) Gr 1(1) NIWF 1(1) Res	7(10)
Spotted Sandpiper <i>Actitis macularis</i>	S-U	3(6) Res 1(1) Creek	4(7)
Willet <i>Catoptrophorus semipalmatus</i>	M-R	1(4) Res	1(4)
Greater Yellowlegs <i>Tringa melanoleuca</i>	M-R	1(3) Gr	1(3)
Lesser Yellowlegs <i>Tringa flavipes</i>	M-R	1(1) Res 1(1) XS	2(2)
Pectoral Sandpiper <i>Calidris melanotos</i>	M-R	1(1) Res	1(1)
Long-billed Dowitcher <i>Limnodromus scolopaceus</i>	M-R	1(1) Res	1(1)
American Avocet <i>Micropalama himantopus</i>	M-R	1(2) Res	1(2)

Killdeer <i>Charadrius vociferus</i>	B-A	23(48) Creek 21(67) Gr 19(128) Res 9(13) XS 8(14) NIWF 1(3) Creek-NIWF 1(2) Gr-XS 1(1) Homesite	83(276)
Ring-bill Gull <i>Larus delawarensis</i>	M-R	1(1) Gr	1(1)
Mourning Dove <i>Zenaidura macroura</i>	B-A	75(295) Creek 25(65) Gr 24(99) Pine 13(82) Creek-Pine 10(34) NIWF 8(28) XS 5(26) Creek-NIWF 3(54) Homesite-Gr 3(47) GR-Xs 3(25) Creek-XS 2(40) NIWF-XS 2(26) Creek-GR 1(9) Homesite 1(8) Creek-Pine-Gr 1(6) Res 1(5) NIWF-XS	177(849)
Black-billed Cuckoo <i>Coccyzus erythrophthalmus</i>	S-R	1(1) Creek	1(1)
Great-Horned Owl <i>Bubo virginianus</i>	R-C 1/	6(7) Creek 3(3) XS 2(2) Pine 2(2) Gr 1(1) NIWF	14(15)
Burrowing Owl <i>Athene cunicularia</i>	S-R	1(2) XS	1(2)
Short-eared Owl <i>Asio flammeus</i>	S-U 1/	1(1) Pine	1(1)
Common Nighthawk <i>Chordeiles minor</i>	B-A	17(41) XS 13(36) Pine 13(38) Creek 11(45) Gr 5(9) NIWF 2(11) Creek-Pine 1(4) Creek-Gr 1(1) Res	63(185)

Belted Kingfisher <i>Megasceryle alcyon</i>	S-U	4(6) Creek	4(6)
Common Flicker <i>Colaptes auratus</i>	R-A	78(118) Creek 24(36) XS 18(38) Pine 17(28) Gr 9(19) NIWF 2(3) Homesite 1(1) Res	149(246)
Red-headed Woodpecker <i>Melanerpes erythrocephalus</i>	b-U	2(2) Pine 1(1) Creek 1(1) Homesite 1(1) Gr 1(1) XS 1(1) NIWF	7(7)
Hairy Woodpecker <i>Picoides villosus</i>	R-R	2(3) Creek 1(1) Pine	3(4)
Downy Woodpecker <i>Picoides pubescens</i>	R-R	2(2) Creek	2(2)
Eastern Kingbird <i>Tyrannus tyrannus</i>	B-A	76(122) Creek 48(57) XS 26(37) Gr 10(16) Homesite 11(19) NIWF 5(8) Pine 4(6) Res 2(2) Creek-Pine	182(267)
Western Kingbird <i>Tyrannus verticalis</i>	b-C	16(21) XS 9(10) Gr 6(7) NIWF 5(7) Creek 4(6) Homesite 1(2) Pine	41(53)
Say's Phoebe <i>Sayornis saya</i>	b-C	14(20) Gr 10(18) XS 6(9) Creek 5(7) NIWF 4(10) Homesite 3(4) Pine	42(68)
Least Flycatcher <i>Empidonax minimus</i>	M-R	2(2) Creek	2(2)
Western Flycatcher <i>Empidonax difficilis</i>	M-R	2(2) Pine 1(1) Creek	3(3)

Western Wood Pewee <i>Contopus sordidulus</i>	B-C 1/	12(18) Creek 8(13) Pine 2(8) Creek-Pine 1(1) XS	23(40)
Horned Lark <i>Eremophila alpestris</i>	R-A	34(179) Gr 30(169) NIWF 7(12) XS 4(26) NIWF-Gr 1(2) Res 1(2) Gr-XS	77(390)
Violet-green Swallow <i>Tachycineta thalassina</i>	B-U	6(16) Creek 2(18) Res 2(5) Pine 1(2) Homesite 1(1) Gr	12(42)
Tree Swallow <i>Iridoprocne bicolor</i>	b-U	1(6) Res 1(2) Creek 1(1) XS	3(9)
Rough-winged Swallow <i>Stelgidopteryx ruficollis</i>	b-U	3(4) Creek 1(6) Res	2(10)
Barn Swallow <i>Hirundo rustica</i>	b-A	52(91) Creek 30(61) Gr 29(57) XS 26(108)Homesite 11(48) NIWF 4(46) Res 1(6) Creek-Gr 1(3) Creek-XS 1(2) NIWF-XS 1(2) Gr-XS 1(1) Pine	157(425)
Cliff Swallow <i>Petrochelidon pyrrhonota</i>	B-A	15(465) Creek 2(52) Res 1(14) Creek-Gr 1(6) NIWF 1(5) Homesite	20(542)
Blue Jay <i>Cyanocitta cristata</i>	M-R	1(1) Creek	1(1)
Black-billed Magpie <i>Pica pica</i>	R-A	52(91) Creek 46(175) Pine 14(31) Gr 7(19) NIWF 3(4) Homesite 3(3) XS	125(323)

Pinon Jay <i>Gymnorhinus cyanocephalus</i>	R-C 1/	7(184) Pine 1(1) Gr	8(185)
Common Crow <i>Corvus brachyrhynchos</i>	b-A	15(32) Creek 9(32) Gr 6(99) NIWF 2(5) XS 2(2) Pine 1(3) Gr-XS 1(1) Res	36(174)
Black-capped Chickadee <i>Parus atricapillus</i>	R-C	11(31) Pine 4(7) Creek 1(3) Creek-Pine	16(41)
White-breasted Nuthatch <i>Sitta Carolinensis</i>	B-U	3(3) Pine 2(2) Creek	5(5)
Red-breasted Nuthatch <i>Sitta canadensis</i>	b-R	See Pine Transect Table	
House Wren <i>Troglodytes aedon</i>	B-C	27(53) Creek 5(8) Pine 4(7) Homesite 1(1) Gr	37(69)
Rock Wren <i>Salpinctes obsoletus</i>	b-R	5(5) Gr	5(5)
Mockingbird <i>Mimus polyglottos</i>	M-R	1(1) Creek 1(1) Pine	2(2)
Gray Catbird <i>Dumetella carolinensis</i>	b-U	12(19) Creek 1(1) Pine	13(20)
Brown Thrasher <i>Torostoma rufum</i>	b-C	31(53) Creek 1(1) Pine 1(1) Homesite	33(55)
Robin <i>Turdus migratorius</i>	B-A	71(181) Creek 14(31) Pine 14(27) Gr 10(34) Homesite 9(16) XS 8(33) Creek-Pine 4(9) NIWF 2(7) Creek-Gr 1(15) Homesite-Gr 1(3) Homesite-Pine	134(356)
Swainson's Thrush <i>Catharus ustulatus</i>	M-R	1(1) Creek	1(1)

Mountain Bluebird <i>Sialia currucoides</i>	B-A	30(66) Creek 25(52) XS 22(51) Gr 12(23) Pine 8(29) NIWF 3(5) Creek-Pine 3(3) Homesite	103(229)
Townsend's Solitaire <i>Myadestes townsendi</i>	M-U	3(3) Pine 1(1) Creek	4(4)
Water Pipit <i>Anthus spinoletta</i>	M-R	1(15) NIWF	1(15)
Bohemian Waxwing <i>Bombycilla garrulus</i>	M-R	1(15) Creek	1(15)
Cedar Waxwing <i>Bombycilla cedrorum</i>	M-R	See Creek Transect Table	
Northern Shrike <i>Lanius excubitor</i>	W-U	5(5) Creek 4(4) Gr 1(1) NIWF	10(10)
Loggerhead Shrike <i>Lanius ludovicianus</i>	b-U	6(6) Gr 5(5) Creek 4(4) NIWF 3(3) XS 1(1) Pine	19(19)
Starling <i>Sturnus vulgaris</i>	B-A	13(20) Creek 7(55) Gr 4(33) Homesite 4(35) XS 4(34) NIWF 1(6) NIWF-Gr 1(2) Creek-NIWF 1(1) Res	35(187)
Yellow Warbler <i>Dendroica petechia</i>	B-A	74(210) Creek 3(8) Homesite 3(8) Creek-Pine	80(226)
Yellow-rumped Warbler <i>Dendroica coronata</i>	M-U	1(20) Creek 1(1) Pine	2(21)
Yellow-breasted Chat <i>Icteria virens</i>	b-U	8(13) Creek	8(13)
House Sparrow <i>Passer domesticus</i>	R-U	3(38) Homesite 1(5) Homesite-Gr	4(43)

Western Meadowlark <i>Sturnella neglecta</i>	B-A	136(873) Gr 88(549) XS 63(639) NIWF-Gr 36(383) Gr-XS 18(112) NIWF 6(44) NIWF-XS 1(9) Creek 1(8) Creek-XS 1(2) Res	350(2619)
Yellow-headed Blackbird <i>Xanthocephalus xanthocephalus</i>	b-U	4(15) Res 2(7) NIWF 2(4) Creek	8(26)
Red-winged Blackbird <i>Agelaius phoeniceus</i>	B-A	13(87) Res 6(167) NIWF 6(94) Homesite 5(45) Gr 2(12) XS 1(20) Gr-Creek-NIWF 1(13) NIWF-Gr 1(2) Homesite-NIWF	34(440)
Orchard Oriole <i>Icterus spurius</i>	M-R	2(5) Creek 1(1) Pine	3(6)
Northern Oriole <i>Icterus galbula</i>	B-C	25(46) Creek 3(3) NIWF 2(2) Gr 2(2) Homesite 1(2) Creek-Pine 1(1) Pine 1(1) XS	35(57)
Brewer's Blackbird <i>Euphagus cyanocephalus</i>	B-A	51(336) Creek 14(178) Gr 9(439) NIWF 6(34) XS 5(145) Res 4(13) Homesite 3(10) Creek-Gr 3(6) Pine 2(15) Creek-XS 2(8) NIWF-Gr 2(5) Creek-Pine	101(1189)
Common Grackle <i>Quiscalus quisqualis</i>	M-R 1/	2(6) Homesite	2(6)

Brown-headed Cowbird <i>Molothrus ater</i>	b-A	18(60) Creek 15(37) Gr 11(67) XS 5(13) NIWF 2(7) Res 1(2) Homesite	52(186)
Evening Grosbeak <i>Hesperiphona vespertina</i>	M-R 1/	1(16) Creek	1(16)
Common Redpoll <i>Carduelis flammea</i>	W-U	1(30) Creek 1(8) XS	2(38)
Pine Siskin <i>Carduelis pinus</i>	M-R	1(1) Pine	1(1)
American Goldfinch <i>Carduelis tristis</i>	b-A	25(55) Creek 9(27) GR 7(14) XS 1(6) Pine 1(4) NIWF	43(106)
Red Crossbill <i>Loxia curvirostra</i>	b-A	20(120) Pine 6(37) Creek 2(12) Res 2(9) Creek-Pine 2(2) Gr	32(180)
Rufous-sided Towhee <i>Pipilo erythrophthalmus</i>	B-A	47(76) Creek 11(16) Pine 5(19) Creek-Pine 1(2) Homesite 1(1) NIWF 1(1) Gr 1(1) XS	67(116)
Lark Bunting <i>Calamospiza melanocorys</i>	b-A	60(357) XS 20(283) Gr 4(32) NIWF 1(50) NIWF-Gr 1(2) Homesite 1(1) Creek	87(725)
Savannah Sparrow <i>Passerculus sandwichensis</i>	M-U	2(3) Gr 2(2) Creek 1(4) NIWF	5(9)
Grasshopper Sparrow <i>Ammodramus saviannarum</i>	b-C	5(9) XS 4(8) Gr 1(6) NIWF	10(23)

Vesper Sparrow <i>Poocetes gramineus</i>	b-A	93(277) Gr 86(282) XS 10(32) NIWF 8(39) NIWF-Gr 8(32) Gr-XS 2(13) Creek 2(5) Creek-Gr 1(5) Creek-XS	210(685)
Lark Sparrow <i>Chondestes grammacus</i>	B-A	24(105) Creek 21(88) XS 18(58) Gr 10(63) Pine 5(12) NIWF 3(54) Creek-Pine 2(22) Creek-XS 2(5) Homesite 1(20) Pine-Gr	86(364)
Dark-eyed Junco <i>Junco nyemalis</i>	M-U	4(20) Creek 1(1) NIWF	5(21)
Tree Sparrow <i>Spizella arborea</i>	M-U	2(7) NIWF 1(20) Creek 1(8) Gr	4(35)
Chipping Sparrow <i>Spizella passerina</i>	b-A	14(87) Creek 6(57) Gr 4(12) Pine 3(15) XS 1(2) Homesite	28(173)
Brewer's Sparrow <i>Spizella breweri</i>	M-R	1(1) XS	1(1)
Field Sparrow <i>Spizella pusilla</i>	M-U	2(5) Gr 1(2) Creek-Gr 1(1) XS	4(8)
White-crowned Sparrow <i>Zonotrichia leucophrys</i>	M-R	1(2) Gr	1(2)

1. Deviation made from classification scheme.

2. Numbers are total number of sightings (total number of individuals sighted)

STATUS AND RELATIVE ABUNDANCE

R — Resident Species
B — Definite breeding species
b — Suspected breeding species
W — Wintering species
M — Migrant species
A — Abundant 100+ individuals
C — Common 50+ individuals
U — Uncommon 2+ individuals
R — Rare 1-2 individuals

HABITATS

Creek — Creek Bottom
Pine — Ponderosa Pine
Gr — Grassland
XS — Sagebrush
Res — Reservoirs
NIWF — Agriculture Land
Homesite

TABLE 8
RESULTS OF THE CREEK BIRD CENSUS TRANSECTS

Species	On Transect	% Comp.	Off Transect	% Comp.	Total On × Off	% Comp.	Relative Abundance
Mourning Dove	7	2.1	3	1.7	10	2.0	C
Common Flicker	5	1.5	9	5.1	14	2.8	C
Hairy Woodpecker	1	0.3	2	1.1	3	0.6	U
Eastern Kingbird	26	7.6	5	2.8	30	6.0	A
Least Flycatcher	2	0.6	—	—	2	0.4	R
Western Flycatcher	1	0.3	—	—	1	0.2	R
Western Wood Pewee	11	3.4	7	4.0	18	3.6	A
Black-capped Chickadee	2	0.6	—	—	2	0.4	R
White-breasted Nuthatch	2	0.6	—	—	2	0.4	R
House Wren	28	8.6	14	8.0	42	8.3	A
American Robin	12	3.7	7	4.0	19	3.8	A
Swainson's Thrush	1	0.3	—	—	1	0.2	R
Mountain Bluebird	11	3.4	10	5.7	21	4.2	A
Cedar Waxwing	3	0.9	—	—	3	0.6	U
Yellow Warbler	100	30.6	34	19.3	134	26.6	A
Yellow-breasted Chat	7	2.1	—	—	7	1.4	C
Western Meadowlark	2	0.6	6	3.4	8	1.6	U 1/
Red-winged Blackbird	5	1.5	12	6.8	17	3.4	A
Northern Oriole	20	6.1	3	1.7	23	4.6	A
Brewer's Blackbird	25	7.6	9	5.1	34	6.8	A
Brown-headed Cowbird	6	1.8	10	5.7	16	3.2	A
American Goldfinch	8	2.4	2	1.1	10	2.0	C
Red Crossbill	1	0.3	8	4.5	9	1.8	C
Rufous-sided Towhee	15	4.6	9	5.1	24	4.8	A
Vesper Sparrow	2	0.6	—	—	2	0.4	U 1/
Lark Sparrow	12	3.7	7	4.0	19	3.8	A
Chipping Sparrow	13	4.0	4	2.3	17	3.4	A
Mallard	—	—	2	1.1	2	0.4	A 1/
Common Nighthawk	—	—	5	2.8	5	1.0	U
Violet green Swallow	—	—	3	1.7	3	0.6	U
Pinyon Jay	—	—	4	—	4	0.8	U
Grasshopper Sparrow	—	—	1	0.6	1	0.2	R
Number of Individuals	327		176		503		
Number of Species	27		24		32		

1. Deviation from classification scheme.

Abundant — less than 15 individuals
Uncommon — 3-6 individuals

Common — 7-14 individuals
Rare — 1-2 individuals

TABLE 9
RESULTS OF THE PINE BIRD CENSUS TRANSECTS

Species	On Transect	% Comp.	Off Transect	% Comp.	Total On × Off	% Comp.	Relative Abundance
Mourning Dove	8	8.0	25	17.4	33	14.0	A
Common Flicker	2	2.0	5	3.5	7	3.0	C
Western Wood Pewee	22	22.0	16	11.1	38	16.1	A
White-breasted Nuthatch	6	6.0	6	4.2	12	5.1	C
Red-breasted Nuthatch	3	3.0	7	4.9	10	4.2	C
House Wren	5	5.0	11	7.6	16	6.8	A
American Robin	16	16.0	11	7.6	27	11.4	A
Yellow-rumped Warbler	3	3.0	1	0.7	4	1.7	U
Western Meadowlark	2	2.0	—	—	2	0.8	R
Brewer's Blackbird	3	3.0	—	—	3	1.3	U
Red Crossbill	17	17.0	22	15.3	39	16.5	A
Lark Sparrow	2	2.0	3	2.1	5	2.1	U
Chipping Sparrow	10	10.0	3	2.1	13	5.5	A 1/
Merlin	—	—	1	0.7	1	0.4	R
Hairy Woodpecker	—	—	3	2.1	3	1.3	U
Violet-green Swallow	—	—	4	2.8	4	1.7	U
Pinyon Jay	—	—	2	1.4	2	0.8	U 1/
Black-capped Chickadee	—	—	7	4.9	7	3.0	C
Northern Oriole	—	—	3	2.1	3	1.3	U
American Goldfinch	—	—	3	2.1	3	1.3	U
Rufous-sided Towhee	—	—	4	2.8	4	1.7	U
Number of Individuals	99		137		236		
Number of Species	13		19		21		

1. Deviation from classification scheme

Abundant — less than 15 individuals
Common — 7-14 individuals

Uncommon — 3-6 individuals
Rare — 1-2 individuals

Sagebrush

Only eleven species, five species on the transect and six species off the transect, were observed on the sagebrush transect (Table 10). Sharp-tailed grouse, killdeer, western meadowlark, vesper sparrow, and Brewer's sparrow were the more abundant species. Although this data would suggest that sagebrush habitat was not important to non-game birds, this is not the case, but rather the opposite. Several species, such as Brewer's sparrow and sage grouse, depend upon sagebrush for their survival and without it, they soon disappear. The killdeer was the only bird found nesting on the transect.

Grassland

The least number of species and individuals were found on the grassland transect, even though it was twice the length of the other transects (Table 11). The lack of cover, residual vegetation, et cetera, in grassland was not very attractive to non-game birds, and only four species were observed there: western meadowlark, vesper sparrow, horned lark, and kestrel. The western meadowlark was the only species observed nesting there.

MAMMALS

Twenty-nine species of mammals were identified on the study area. These mammals, plus data on relative abundance and habitat utilization, are listed in Table 12. Mule deer, white-tailed deer, antelope, and furbearers/predators were discussed in previous sections. The majority of the remaining non-game mammals were small rodents which will be discussed in the small mammal trapping section.

Although several nights were spent mist-netting for bats, only one little brown myotis was captured. Approximately 25 observations of bats were made. The marked size difference indicated at least two species, and probably more. Lampe, et al. (1974) collected the following bats in Carter County (Long Pine Hills): long-eared myotis (*Myotis evotis*), small-footed myotis (*Myotis leibii*), little brown myotis (*Myotis lucifugus*), long-legged myotis (*Myotis volans*), silver-haired bat (*Lasionycteris noctivagans*), big brown bat (*Eptesicus fuscus*), hoary bat (*Lasiurus cinereus*), and Townsend's big-eared bat (*Plecotus townsendii*). Their study area and habitats were similar and reasonably close enough to this study area to consider these bats as also occurring here.

White-tailed jackrabbits were relatively common, particularly along roadside ditches. The only cottontail observed was the desert cottontail, and only a few were observed during the study. Although they were not found in this particular study, two additional species of cottontails may exist there. The mountain cottontail, *Sylvilagus nuttalli*, is found throughout Montana, except for the northwestern corner and extreme eastern edge of the state (Hoffman and Pattie, 1968). It is normally restricted to riparian shrub

TABLE 10
RESULTS OF THE SAGEBRUSH BIRD CENSUS TRANSECTS

Species	On Transect	% Comp.	Off Transect	% Comp.	Total On × Off	% Comp.	Relative Abundance
Sharp-tailed Grouse	4	8.9	3	2.2	7	4.0	C
Killdeer	4	8.9	13	9.4	17	9.8	A
Western Meadowlark	2	4.4	32	23.2	34	19.7	A
Vesper Sparrow	29	64.4	37	26.8	66	38.2	A
Brewer's Sparrow	6	13.3	1	0.7	7	4.0	C
Mallard	—	—	1	0.7	1	0.6	R
Common Flicker	—	—	1	0.7	1	0.6	R
Eastern Kingbird	—	—	5	3.6	5	2.9	U
Bank Swallow	—	—	1	0.7	1	0.6	R
Red-winged Blackbird	—	—	18	13.0	18	10.4	C 1/
Brewers Blackbird	—	—	26	1.8	2	1.2	C 1/
Number of Individuals	45		138		173		
Number of Species	5		11		11		

1. Deviation from classification scheme.

Abundant — less than 15 individuals
Uncommon — 3-6 individuals

Common — 7-14 individuals
Rare — 1-2 individuals

TABLE 11
RESULTS OF THE GRASSLAND BIRD CENSUS TRANSECTS

Species	On Transect	% Comp.	Off Transect	% Comp.	Total On × Off	% Comp.	Relative Abundance
Western Meadowlark	15	51.7	54	74.0	69	67.6	A
Vesper Sparrow	14	48.3	17	23.3	31	30.4	A
Kestrel	—	—	1	1.4	1	1.0	U 1/
Horned Lark	—	—	1	1.4	1	1.0	U 1/
Number of Individuals	29		73		102		
Number of Species	2		4		4		

1. Deviation from classification scheme.

Abundant — less than 15 individuals
Uncommon — 3-6 individuals

Common — 7-14 individuals
Rare — 1-2 individuals

TABLE 12
MAMMALS IDENTIFIED ON THE STUDY AREA

SPECIES	SIGHTINGS BY HABITAT	TOTAL SIGHTINGS
Masked Shrew <i>Sorex cinereus</i>	See Text-Trap Data	
Little Brown Bat <i>Myotis lucifugus</i>	1(1) Creek	1(1)
Unknown Bats	9(28) NIWF 7(17) XS 4(17) Creek 4(8) Gr 1(5) Homesite	25(75)
White-tailed Jackrabbit <i>Lepus townsendi</i>	63(68) Gr 24(27) XS 5(7) NIWF 2(2) Creek	94(104)
Desert Cottontail <i>Sylvilagus auduboni</i>	16(18) XS 5(5) Gr 1(1) Homesite 1(1) Creek 1(1) Res	24(26)
Porcupine <i>Erethizon dorsatum</i>	17(18) Creek 17(18) Gr 7(11) NIWF 6(6) XS 4(4) Pine	51(57)
Beaver <i>Castor canadensis</i>	See Text-Predators and Furbearers	
Northern Pocket Gopher <i>Thomomys talpoides</i>	See Text-Nongame Mammals	
Least Chipmunk <i>Eutamias minimus</i>	3(4) Creek 1(1) Gr	4(5)
Black-tailed Prairie Dog <i>Cynomys ludovicianus</i>	1(1) XS 1(1) Gr	2(2)
Thirteen-lined Ground Squirrel <i>Spermophilus tridecemlineatus</i>	12(13) XS 11(12) Gr 1(1) NIWF 1(1) Res 1(1) Creek	26(28)

Red Squirrel <i>Tamiasciurus hudsonicus</i>	See Text-Pine Transect	
Bushy-tailed Woodrat <i>Neotoma cinerea</i>	1(1) XS	1(1)
Western Harvest Mouse <i>Reithrodontomys megalotis</i>	See Text-Trap Data	
Northern Grasshopper Mouse <i>Onychomys leucogaster</i>	See Text-Trap Data	
Deer Mouse <i>Peromyscus maniculatus</i>	See Text-Trap Data	
Muskrat <i>Ondatra zibethica</i>	22(37) Creek 11(23) Res 1(1) XS 1(1) Gr	35(62)
Prairie Vole <i>Microtus ochrogaster</i>	See Text-Trap Data	
Bobcat <i>Lynx rufus</i>	1(1) Creek	1(1)
Raccoon <i>Procyon lotor</i>	2(6) NIWF 1(6) Pine 1(1) Creek 1(1) Gr	5(14)
Red Fox <i>Vulpes vulpes</i>	13(15) Gr 5(5) NIWF 1(1) Pine 1(1) XS	20(22)
Coyote <i>Canis latrans</i>	12(13) Gr 9(15) XS 6(9) Pine 6(6) NIWF 5(5) Creek 1(1) Res	38(49)
Striped Skunk <i>Mephitis mephitis</i>	17(18) Gr 11(11) XS 6(6) NIWF 4(4) Creek 1(2) Gr-XS	39(41)
Badger <i>Taxidea taxus</i>	3(3) Gr 2(2) XS	5(5)
Mink <i>Mustela vison</i>	1(1) Creek	1(1)

Long-tailed Weasel <i>Mustela frenata</i>	4(5) NIWF 3(3) Gr 1(1) Creek	8(9)
Pronghorn <i>Antilocapra americana</i>	168(1294) Gr 130(759) XS 67(654) NIWF 13(54) Creek 3(15) Pine	381(2776)
White-tailed Deer <i>Odocoileus virginianus</i>	7(24) Creek 4(20) Gr 4(11) Pine 4(6) XS 3(6) NIWF	22(67)
Mule Deer <i>Odocoileus hemionus</i>	187(815) Gr 122(470) Pine 87(350) XS 54(212) NIWF 46(182) Creek 2(22) Pine-Gr 2(2) Homesite	500(2053)

1. Numbers are total number of sightings (total) number of individuals sighted).

Creek — Creek Bottom
Gr — Grassland
Res — Reservoir
Homesite

Pine — Ponderosa Pine
XS — Sagebrush
NIWF — Agriculture Land

areas. The other cottontail, *Sylvilagus floridanus*, is the eastern counterpart to the mountain cottontail, and both species utilize the same general habitats. However, the only place that the eastern cottontail has been collected in Montana is Carter County (Lampe, et al, 1974). This is close enough to this study area to also consider the eastern cottontail as a possible occurrence.

Other non-game mammals that were found were the porcupine, red squirrel, bushy-tailed woodrat, and black-tailed prairie dog. Porcupines, considered a pest by most people, were found in the creek and pine habitats. Red squirrels were found in the pine habitat, but were quite uncommon on the area. In fact, they were only seen on the pine bird transect. One bushy-tailed woodrat, a road-kill, was observed in sagebrush which is rather unusual. Bushy-tailed woodrats are usually found on rocky ledges, scoria buttes, and abandoned buildings. Although a few black-tailed prairie dogs were seen, no active towns were found on the area. All observations were isolated cases where just one prairie dog was seen in each instance.

A total of 12,000 trap nights were completed for small mammal sampling during the study; however, this figure was corrected to 11,008 trap nights after empty, sprung traps were subtracted. Overall, there were 294 captures for a 2.67 capture/100 trap night efficiency (Table 13). Six species of small mammals were captured. Deer mice and prairie voles were the more abundant species. They were followed by western harvest mice, masked shrews, thirteen-lined ground squirrels, and northern grasshopper mice in decreasing order of abundance. Least chipmunks and northern pocket gophers were observed several times although they were not captured in the small mammal trapping effort.

Diversity indices (Simpson's Index and the Shannon-Weiner Index) were tabulated for the various habitats (Table 14). These indices are indicators of the ecological diversity or richness of a habitat (Cox, 1972). In other words, the greater the numerical value of these indices, the greater the number of species and individuals in a community. Agriculture was the most diverse habitat followed by the creek sagebrush, grassland, and pine in decreasing order of diversity. This was not expected as creek habitat is normally the most diverse; however, this was believed to be a direct reflection of the drought conditions in the area.

TABLE 13
RESULTS OF SMALL MAMMAL TRAPPING

	Cultivated	Grassland	Creek	Pine	Sagebrush
Trap Nights	2265	2130	2195	2265	2153
Total Captures	106	48	56	17	67
Captures/100 Trap Nights	4.68	2.25	2.55	.075	3.11
Number of Species	5	3a	3a	1	3a
Species:					
Peromyscus maniculatus	76	42	45	17	55
Microtus ochrogaster	27		1		
Reithrodontomys megalotis	1	1			2
Onychomys leucogaster	1				
Spermophilus tridecemlineatus		1			1
Sorex cinereus	1		2		
Birds		1	8b		
Amphibians		1			9c

a. Bird and Amphibians not included in this figure.

b. Five species.

c. Two species.

TABLE 14
DIVERSITY INDICES FOR THE MAJOR HABITAT TYPES - 1, 2

HABITAT	NUMBER OF SPECIES	NUMBER OF INDIVIDUALS	SIMPSON'S INDEX	SHANNON- WEINER INDEX
Cultivated	5	106	1.74	1.036
Creek	3	48	1.14	0.395
Sagebrush	3	58	1.11	0.342
Grassland	3	44	1.10	0.312
Pine	1	17	1.00	0.000

1. Based on small mammal trap data only.
2. The higher the numerical value for the indices, the greater the diversity.

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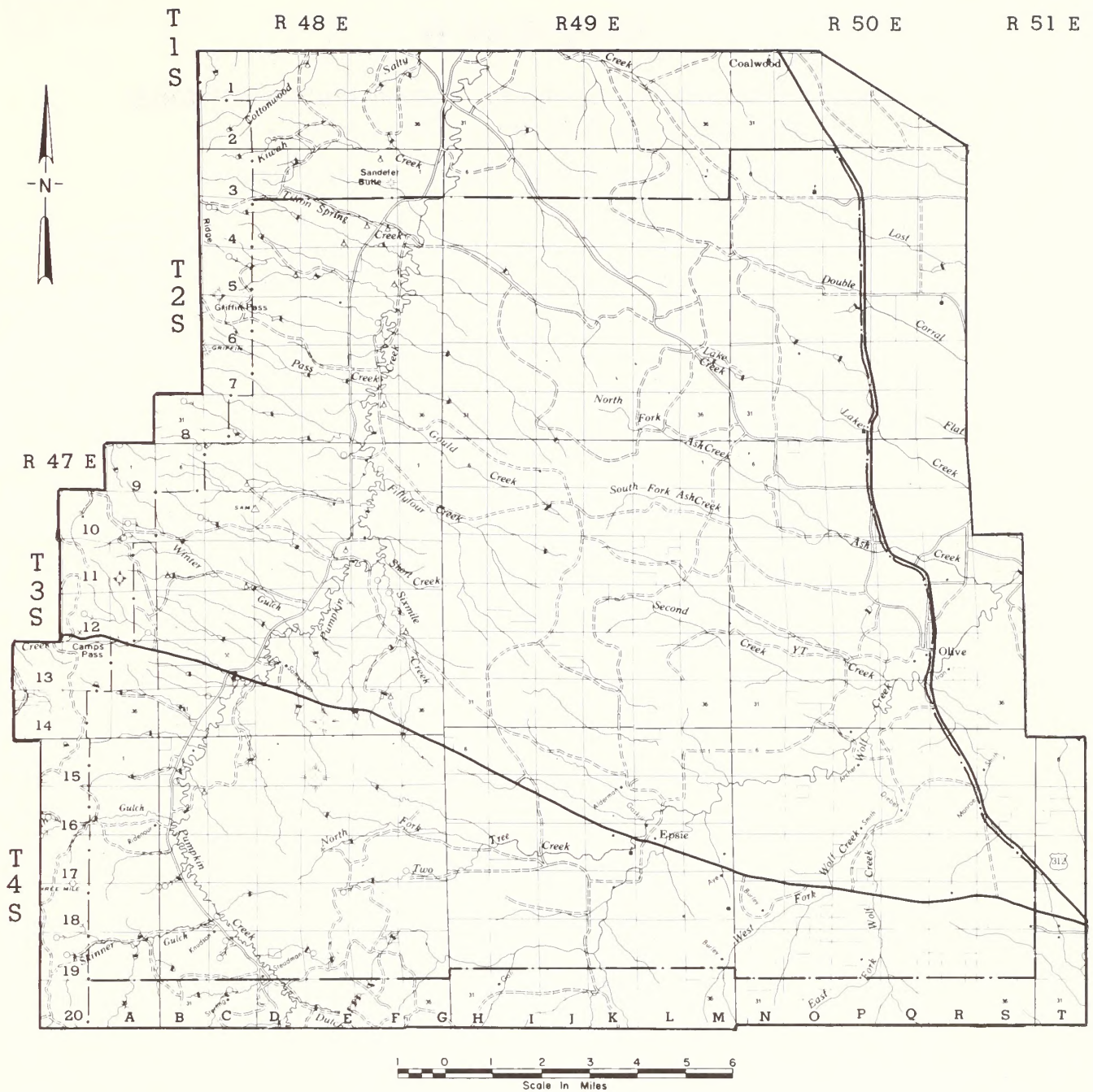
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BROADUS—PUMPKIN CREEK WILDLIFE STUDY AREA

STUDY AREA LOCATION MAP



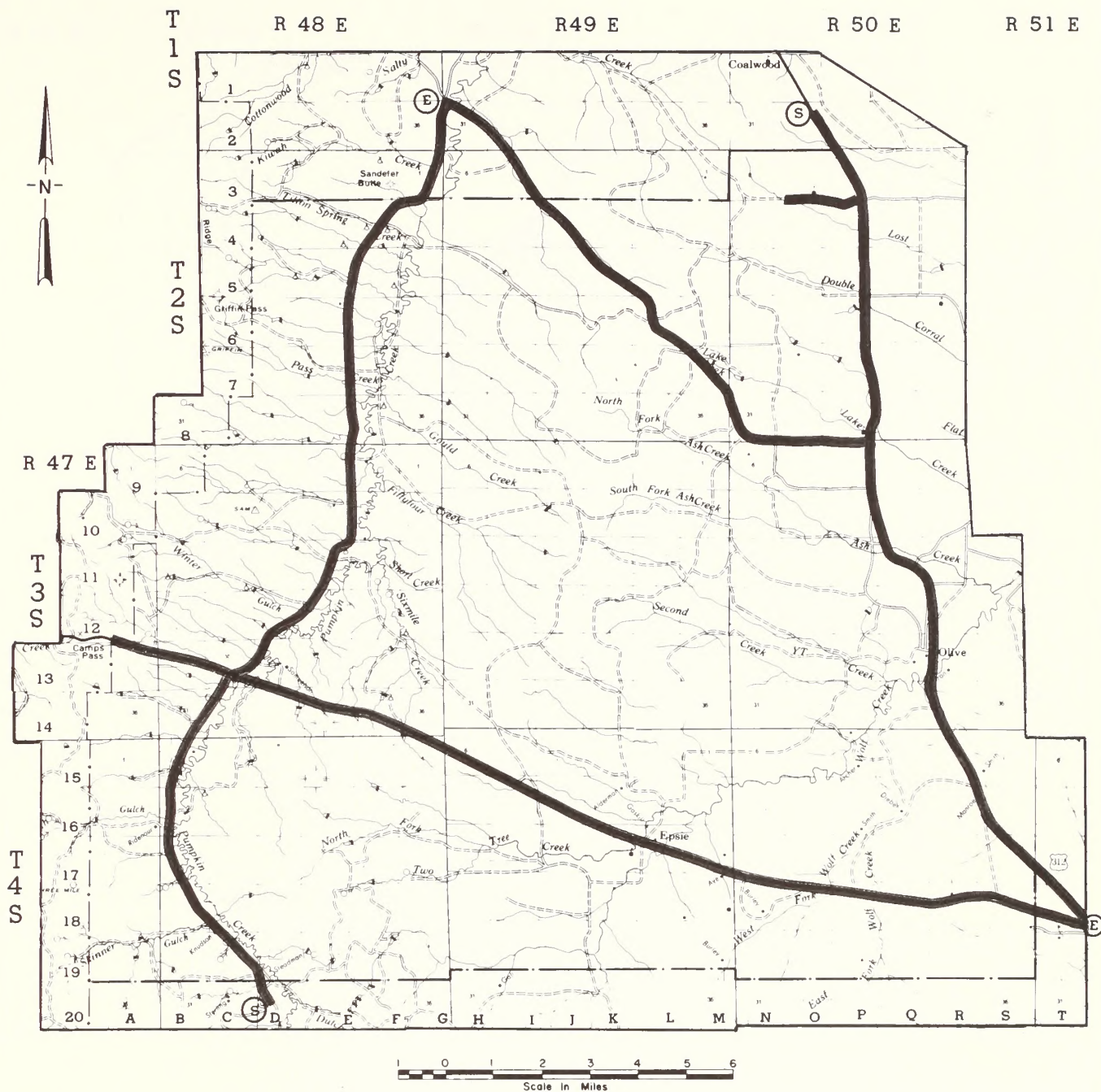
APPENDIX A

APPENDIX B

AVERAGE TEMPERATURE AND PRECIPITATION AND DEPARTURES FROM NORMAL FOR BROADUS 1979-1980

Source: U.S. Department of Commerce 1979-1980

Month	Temperature (°F)	Departure	Precipitation (inches)	Departure
Jan 1979	2.2	-16.0	.31	-.20
Feb	12.3	-12.1	1.25	+.79
Mar	32.0	+1.1	.31	-.39
Apr	42.0	-2.1	.91	-.48
May	52.1	-2.2	1.59	-.64
Jun	64.5	+1.7	1.53	-1.60
Jul	70.3	-0.9	2.43	+1.07
Aug	68.2	-1.4	.36	-.72
Sep	62.1	+4.3	.45	-.75
Oct	49.0	+2.0	.77	-.09
Nov	30.0	-2.5	.51	-.14
Dec	29.5	+6.1	.09	-.39
Jan 1980	15.5	-2.7	.26	-.25
Feb	25.3	+0.9	.70	+.24
Mar	31.3	+0.4	.76	+.06
Apr	49.1	+5.0	.97	-.42
May	58.7	+4.4	.88	-1.35
Jun	66.0	+3.2	3.81	+.68
Jul	73.1	+1.9	.17	-1.19
Aug	64.9	-4.7	1.47	+.39
Sep	57.8	0.0	.62	-.58
Oct	47.1	+0.1	1.15	+.29
Nov	35.3	+2.8	.15	-.50



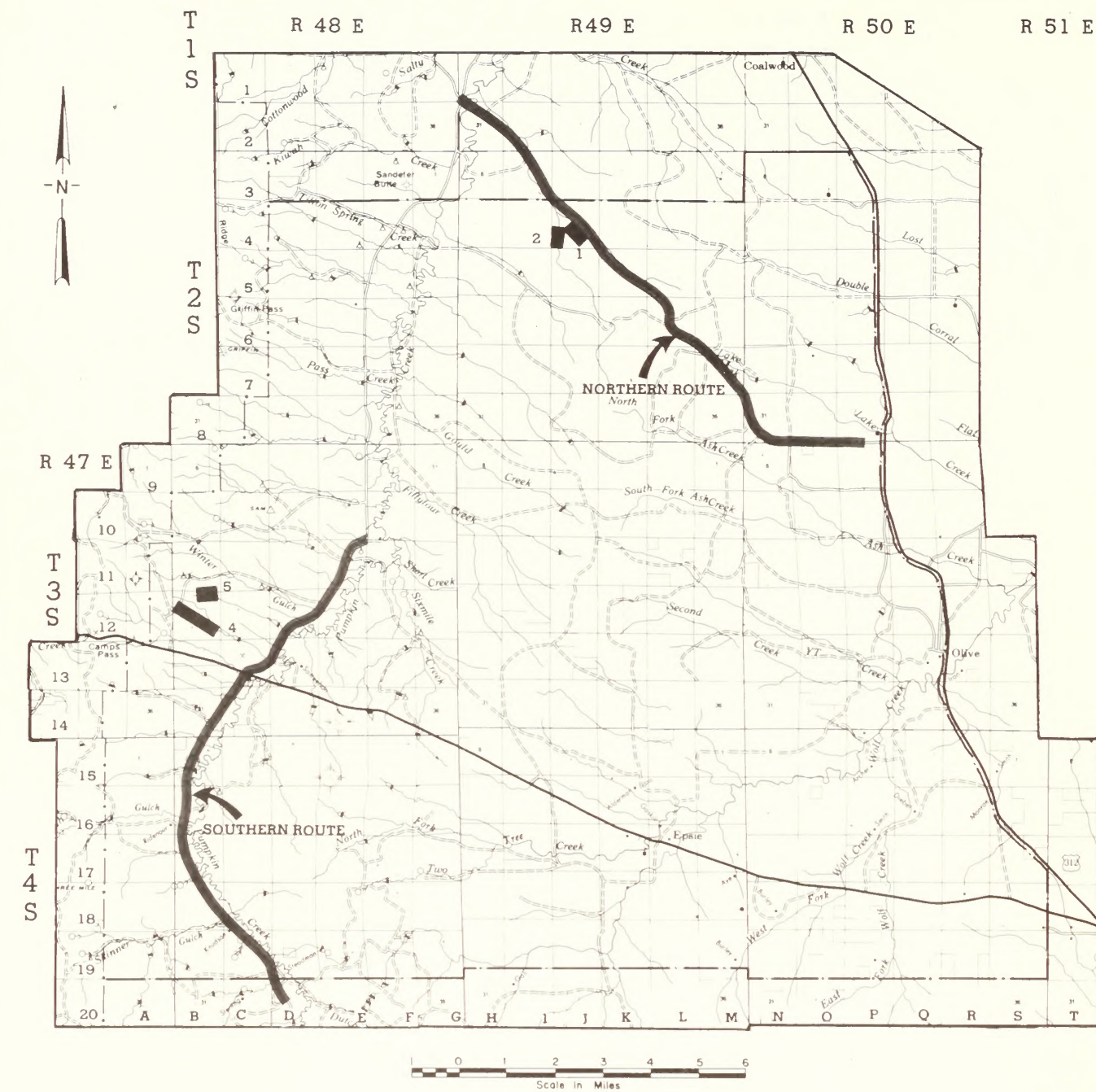
BROADUS—PUMPKIN CREEK WILDLIFE STUDY AREA

WINDSHEILD SURVEY ROUTE AND PHEASANT CROW — COUNT ROUTES

LEGEND:

- Windsheild Survey Route — Outline
- Pheasant Crow — Count Routes
- S — Start
- E — End

APPENDIX C



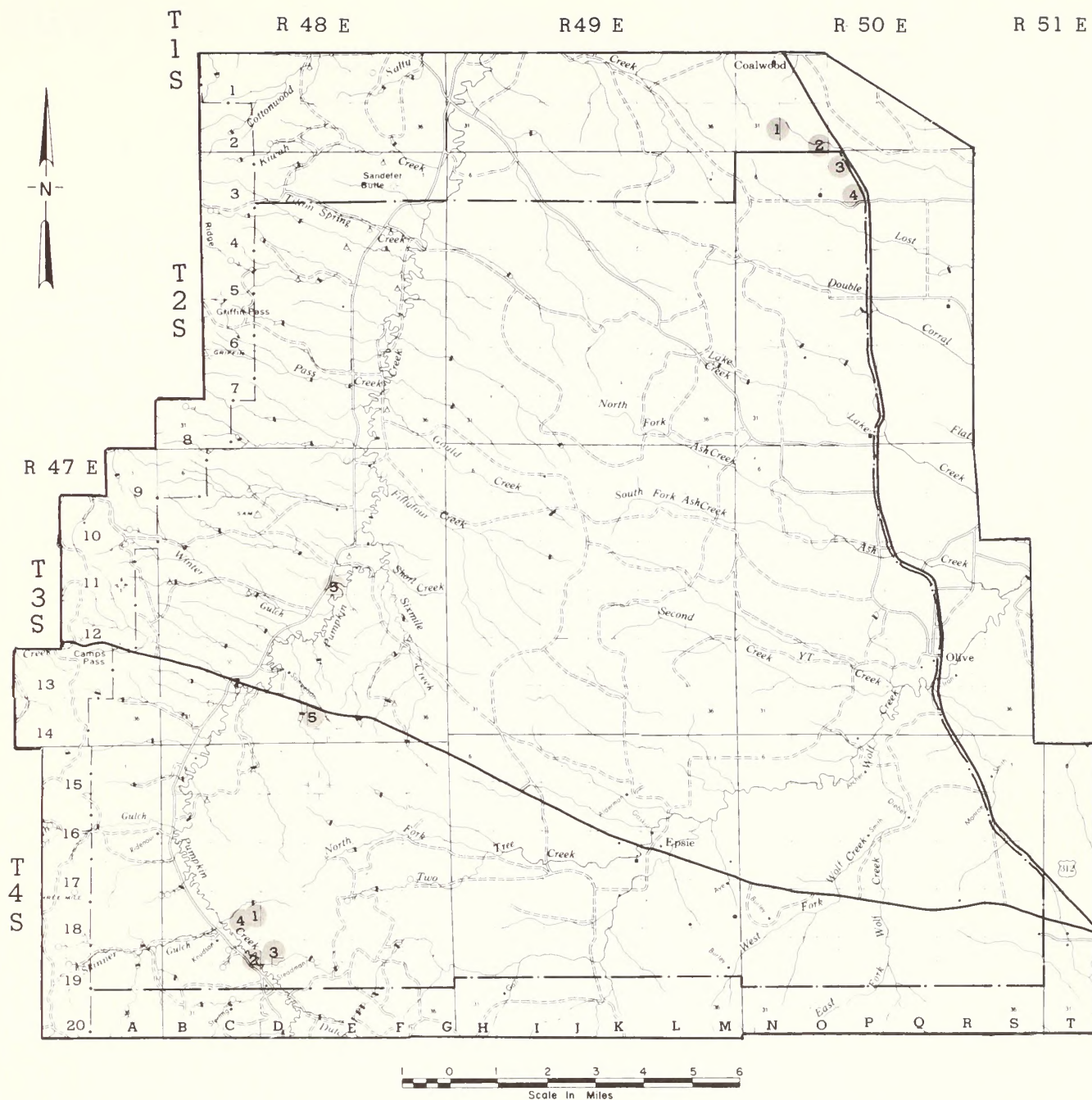
BROADUS—PUMPKIN CREEK WILDLIFE STUDY AREA

BIRD ROUTES AND TRANSECTS

LEGEND:

1. Ponderosa Pine
2. Creek
3. Grassland
4. Sageland

APPENDIX D



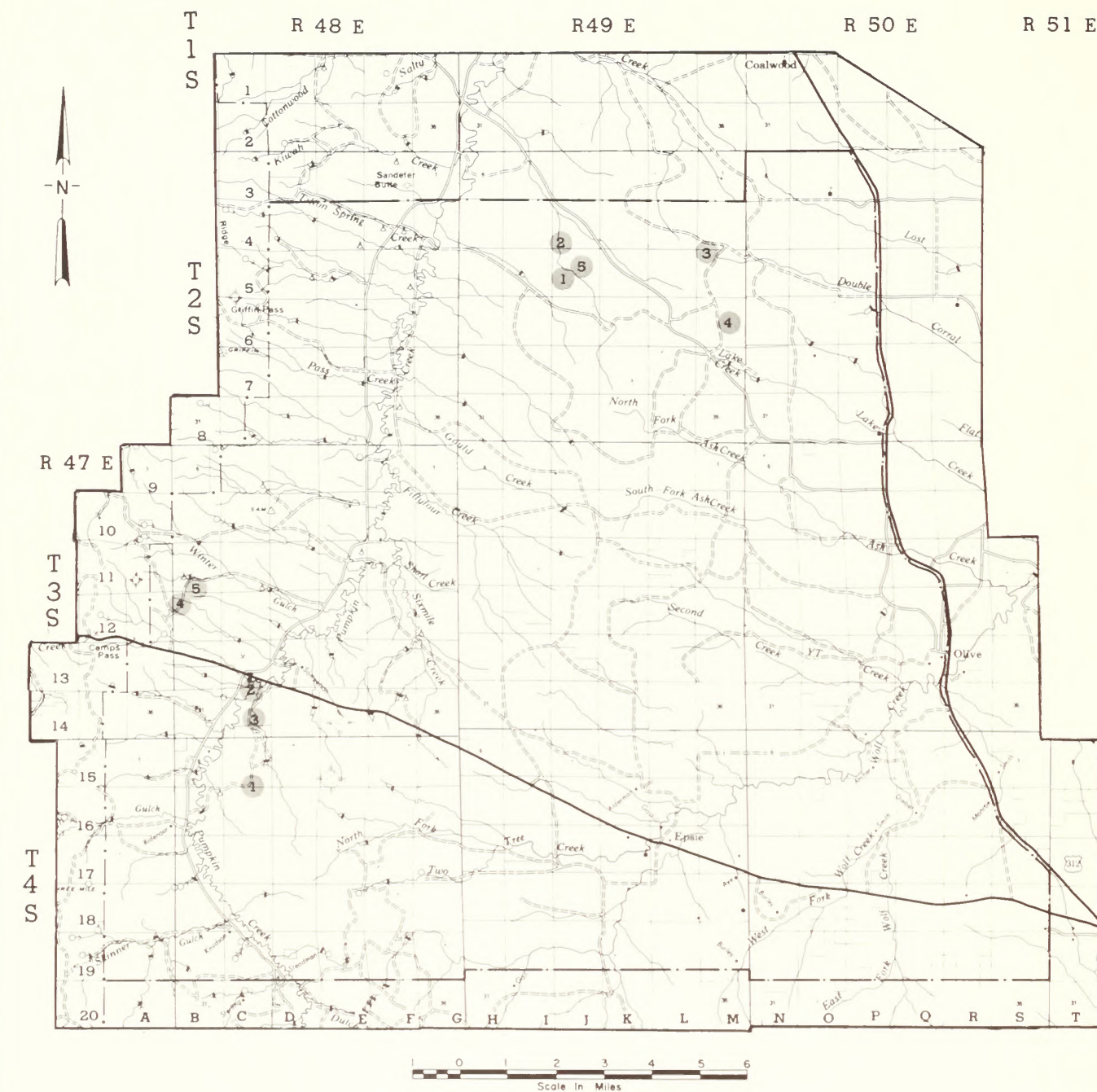
BROADUS—PUMPKIN CREEK WILDLIFE STUDY AREA

FALL — SMALL MAMMAL TRAP SITES

LEGEND:

1. Ponderosa Pine
2. Creek
3. Agriculture
4. Grassland
5. Sagebrush

APPENDIX E



SPRING — SMALL MAMMAL TRAP SITES

LEGEND:

1. Ponderosa Pine
2. Creek
3. Agriculture
4. Grassland
5. Sagebrush

BROADUS — PUMPKIN CREEK WILDLIFE STUDY AREA

APPENDIX F

APPENDIX G

DEER HARVEST STATISTICS, 1979

Source: Montana Department of Fish, Wildlife, and Parks
Big Game Survey and Inventory (Deer) Region 7-1980

HUNTING DISTRICT	AREA (SQ. MI.)	HUNTERS	HARVEST	MULE DEER	WHITE-TAILED DEER	LATE SEASON SPECIAL HUNT EITHER SPECIES
740	1,136	861	415	276	35	104
741	1,124	961	395	242	30	123
792	301	277	195	129	9	57

APPENDIX H

ANTELOPE SURVEY STATISTICS, 1980

Source: Montana Fish, Wildlife, and Parks Big Game Survey and Inventory
(Antelope) Region 7-1980

Hunting Dist.	Sq. Mi.	Year	Male	Female	Young	Total	Density/Sq. Mi
740	510	1972	31	73	42	146	0.3
		1974	27	108	36	171	0.3
		1975	10	39	7	56	0.1
		1978	58	169	115	342	0.7
		1979	16	48	44	108	0.2
741	1,157	1972	216	507	431	1,154	1.0
		1974	161	473	262	896	0.8
		1977	162	493	292	947	0.8
(1) Incomplete Survey		1979 1/	12	64	50	126	—
792	359	1972	50	67	71	188	0.5
		1974	61	123	93	277	0.8
		1975	31	82	45	158	0.4
		1977	70	189	159	418	1.2
		1979	21	60	54	135	0.4

APPENDIX I

TURKEY HARVEST STATISTICS FOR POWDER RIVER COUNTY

Source: Montana Department of Fish, Wildlife, and Parks Upland Game Bird and
Fur Surveys and Inventory - Region 7-1980

FALL SEASON

Year	Number of Hunters	Number of Turkeys Harvested	% Success
1971	257	147	57
1972	344	134	39
1973	360	101	32
1974	479	179	37
1975	688	255	37
1976	509	181	35
1977	490	175	36
1978	642	332	52
1979	604	220	36

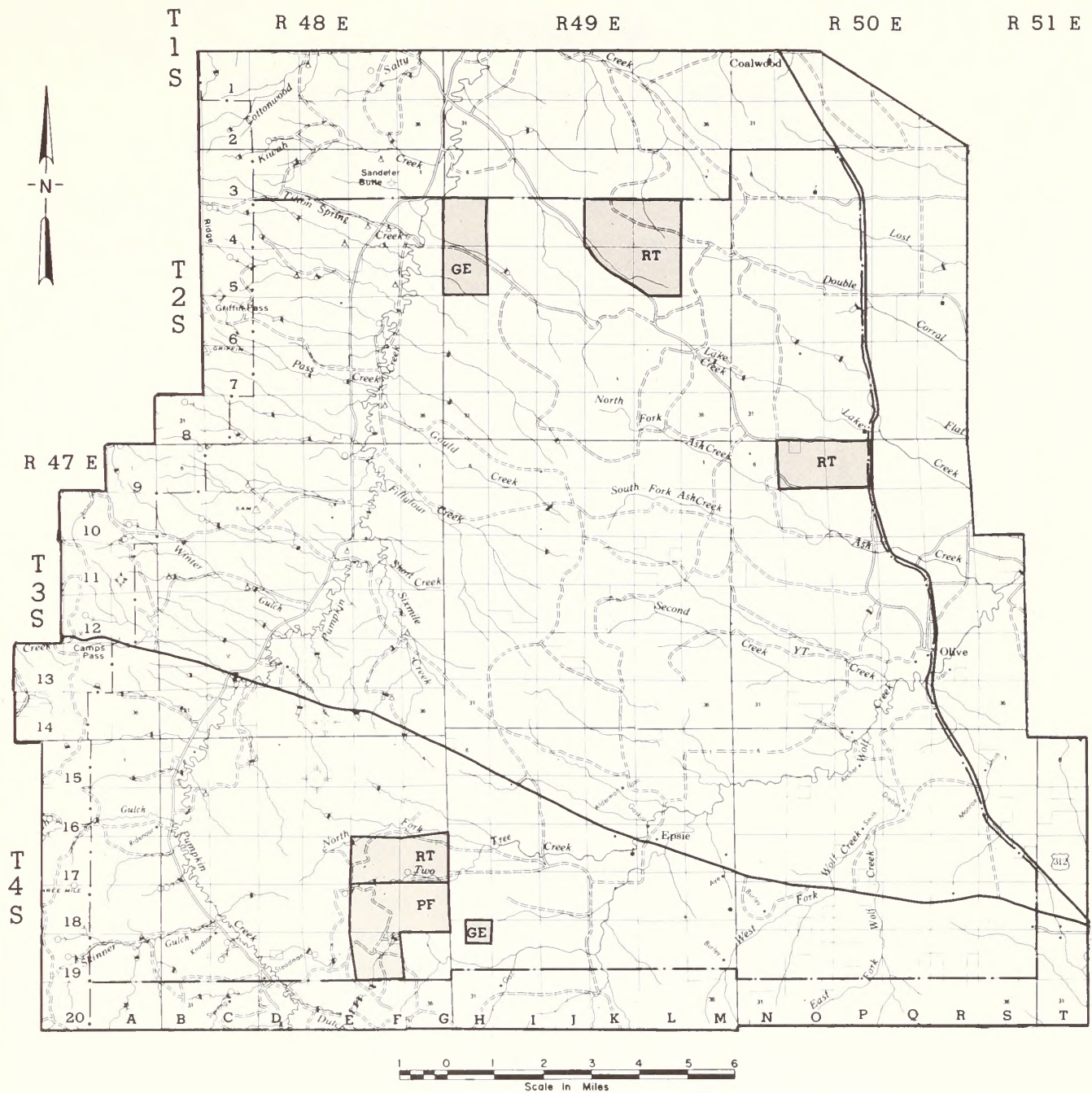
SPRING SEASON

1977	65	12	18
1978	82	31	38
1979	99	13	14

APPENDIX J

LOCATION AND STATUS OF RAPTOR NESTS

SPECIES	LOCATION	STATUS
Red-tailed Hawk	T2S, R49E, Sec. 15 NW1/4 T4S, R49E, Sec. 14 NE1/4 T2S, R49E, Sec. 13 NE1/4 T3S, R48E, Sec. 24 SW1/4 T2S, R49E, Sec. 17 NE1/4 T2S, R49E, Sec. 10,11,14,15 T3S, R50E, Sec. 4,5 T4S, R48E, Sec. 13,14	Active - 2+young Active - 1+young Active - 2 young Active - 1+young Active Territorial Pair Territorial Pair Territorial Pair
Golden Eagle	T2S, R49E, Sec. 9 middle T2S, R49E, Sec. 6 SE1/4 T4S, R50E, Sec. 3 middle T4S, R49E, Sec. 30 NW1/4 T2S, R49E, Sec. 7 or 18	Active - 2 young Active - 2 young Active - 2 young Questionable Questionable
Prairie Falcon	T1S, R49E, Sec. 29 NW1/4 T2S, R49E, Sec. 5 SW1/4 T4S, R48E, Sec. 23,24,26	Active Active - 1 + young Territorial Pair
Marsh Hawk	T4S, R49E, Sec. 17 SW1/4	Active
Kestrel	T2S, R49E, Sec. 5 SW1/4	Active
Great-horned Owl	T1S, R49E, Sec. 32 S1/2	Active



BROADUS—PUMPKIN CREEK WILDLIFE STUDY AREA

TERRITORIAL PAIRS OF RAPTORS FOR WHICH NO NEST WAS LOCATED

LEGEND:

- RT — Red-tailed Hawk
- PF — Prairie Falcon
- GE — Golden Eagle

APPENDIX K

APPENDIX L

FUR HARVEST STATISTICS FOR 1979-1980 SEASON

Source: Montana Fish, Wildlife, and Parks Fur Harvest Survey

	DIST 740	DIST 741	DIST 792	DIST 740-741 792 COMBINED	REGION 7
Beaver	59	2	—	61	4,049
Mink	4	—	4	8	648
Muskrat	22	12	67	101	4,721
Badger	2	68	34	104	704
Coyote	770	232	45	1,067	3,640
Fox	9	91	90	190	3,133
Raccoon	13	42	134	189	2,634
Skunk	34	50	22	106	3,513
Weasel	2	2	—	4	88

APPENDIX M

NESTING BIRDS IDENTIFIED ON THE STUDY AREA

SPECIES	EARLIEST DATE	NEST	DEPENDENT YOUNG	TRANSECT DATA (a)
Pied-billed Grebe	06-19-80		1	
Mallard	06-05-80		10	
Blue-winged Teal	07-03-80		1	
Marsh Hawk	06-18-80	1		
Red-tailed Hawk	05-23-80	5		
Golden Eagle	05-23-80	3		
Prairie Falcon	05-23-80	2		
Kestrel	05-23-80	1		
Turkey	06-20-80		2	
Sage Grouse	06-16-80		4	
Sharp-tailed Grouse	07-01-80		4	
Ring-necked Pheasant	07-02-80		6	
Coot	07-03-80		4	
Killdeer	06-03-80		3	
Mourning Dove	06-05-80	1		
Great-horned Owl	03-25-80	1		
Common Nighthawk	08-20-80		1	
Common Flicker	04-24-80	5	1	
Eastern Kingbird	06-18-80	1		1
Western Wood Pewee	06-17-80			1
Cliff Swallow	05-23-80	1		
Violet-green Swallow	07-02-80	1		
Black-billed Magpie	06-18-80	1	2	
White-breasted Nuthatch	07-16-80			1
House Wren	06-20-80	1	1	1
Robin	06-03-80	2	2	1
Mountain Bluebird	04-17-80	2	2	2
Starling	05-28-80	1		
Yellow Warbler	06-20-80		1	3
W. Meadowlark	05-16-80	3	2	
Red-winged Blackbird	07-10-80		3	
Brewer's Blackbird	05-23-80	1	1	
Northern Oriole	06-20-80		1	4
Rufous-sided Towhee	06-20-80			2
Lark Sparrow	05-28-80	2		

a — Transect data was separate and was not included in the main bulk of the data; however, this was mostly active nests that were observed.

APPENDIX N

SPECIAL STATUS BIRDS FOR POWDER RIVER COUNTY

SPECIES	SPECIAL STATUS	OBSERVED
White Pelican	X	—
Double-crested Cormorant	X	—
Canvasback	X	—
Swainson's Hawk	Y	Yes
Ferruginous Hawk	X,Y	Yes
Cooper's Hawk	Y	—
Bald Eagle	X,Y,Z	Yes
Golden Eagle	X,Y	Yes
Osprey	X	—
Goshawk	Y	—
Merlin	X,Y	Yes
Prairie Falcon	X,Y	Yes
Peregrine Falcon	X,Z	—
Sage Grouse	X	Yes
Whooping Crane	X,Z	—
Sandhill Crane	X	Yes
Upland Sandpiper	Y	Yes
Mountain Plover	X	—
Long-billed Curlew	X,Y	Yes
Burrowing Owl	X	Yes
Lewis Woodpecker	X	—
Mountain Bluebird	Y	Yes
Dickcissel	X	—
Brewer's Sparrow	Y	Yes

X — Federal migratory species of high interest.

Y — "Special interest or concern" species for Montana.

Z — Federal threatened or endangered species.

APPENDIX O

SUMMARY OF POWDERVILLE BREEDING BIRD ROUTE, 1968—1980

SPECIES	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
American Bittern	—	—	1	1	—	—	1	—	—	—	—	—	—
Great Blue Heron	—	—	—	—	—	—	—	—	—	—	—	2	—
Mallard	—	—	—	22	8	7	2	—	2	—	—	13	16
Gadwall	—	—	—	—	7	—	—	—	—	—	—	—	—
Green-winged Teal	—	—	—	—	—	—	—	—	—	—	—	18	—
Blue-winged Teal	—	—	—	—	—	—	4	—	—	—	—	2	—
American Wigeon	—	—	—	—	—	2	2	—	—	—	—	—	—
Shoveler	—	—	—	—	1	—	2	—	—	5	—	—	—
Ruddy Duck	—	—	—	—	—	—	2	—	—	—	—	—	—
Sharp-shinned Hawk	—	—	1	—	—	—	—	—	—	—	—	—	—
Red-tailed Hawk	—	—	—	3	—	1	4	—	2	—	—	3	3
Swainson's Hawk	—	—	—	—	—	—	—	—	—	1	—	—	—
Ferruginous Hawk	2	—	—	—	—	—	—	—	—	—	—	1	1
Golden Eagle	—	—	—	—	—	—	2	—	—	—	—	—	—
Marsh Hawk	2	—	1	1	1	1	—	—	1	—	—	1	2
Prairie Falcon	—	—	—	—	—	—	—	—	—	1	—	—	—
Pigeon Hawk	—	—	—	2	—	—	—	—	—	—	—	—	—
Sparrow Hawk	3	4	1	1	1	—	5	—	2	1	—	5	8
Sharp-tailed Grouse	—	—	4	—	—	—	—	—	—	—	—	2	4
Sage Grouse	—	—	—	6	—	—	1	—	—	5	—	6	16
Ring-necked Pheasant	—	3	2	—	3	9	9	—	1	18	—	5	4
Turkey	—	—	—	—	—	—	—	—	—	—	—	—	2
Sora	—	—	—	—	—	—	—	—	1	—	—	—	—
America Coot	—	—	—	—	—	—	4	—	—	—	—	—	—
Killdeer	8	—	8	9	15	6	13	—	14	6	—	18	26
Common Snipe	—	—	1	2	1	—	3	—	—	—	—	—	—
Spotted Sandpiper	—	—	—	—	—	—	2	—	—	—	—	—	—
Wilson's Phalarope	—	20	—	—	1	—	—	—	—	—	—	—	—
Mourning Dove	19	—	33	26	32	29	16	—	24	29	—	50	111
Yellow-billed Cuckoo	—	—	—	—	—	2	1	—	—	—	—	—	—
Black-billed Cuckoo	—	—	—	—	—	—	—	—	1	—	—	—	—
Great-horned Owl	—	—	—	—	—	—	—	—	2	—	—	—	—
Short-eared Owl	1	—	—	—	2	4	—	—	—	—	—	4	—
Common Nighthawk	6	—	3	6	7	2	3	—	—	—	—	3	15
Belted Kingfisher	—	—	—	—	—	—	1	—	—	—	—	—	—
Red-shafted Flicker	6	12	6	5	14	7	3	—	4	9	—	4	12
Red-headed Woodpecker	—	—	—	—	—	—	1	—	1	—	—	—	—
Eastern Kingbird	—	2	2	2	4	6	9	—	3	3	—	3	6
Western Kingbird	—	—	2	2	1	2	4	—	—	1	—	2	5
Say's Phoebe	—	—	—	—	—	1	—	—	1	3	—	3	9
Western Wood Pewee	—	—	—	—	1	—	—	—	—	—	—	—	—
Olive-sided Flycatcher	—	—	1	—	1	—	—	—	—	—	—	—	—
Horned Lark	—	—	18	22	51	4	10	—	3	7	—	17	38
Tree Swallow	—	—	—	—	—	—	—	—	6	—	—	—	—
Bank Swallow	—	—	—	—	8	—	—	—	—	—	—	—	3
Rough-winged Swallow	3	—	1	—	1	—	2	—	—	—	—	—	1
Barn Swallow	8	—	5	4	4	7	4	—	5	3	—	12	29
Cliff Swallow	—	—	18	38	77	30	75	—	1	54	—	32	87

Black-billed Magpie	3	—	—	—	—	—	—	—	—	—	—	—	3
Common Crow	—	—	—	—	—	—	—	—	—	—	—	1	—
House Wren	—	—	8	7	18	11	12	—	8	14	—	2	5
Rock Wren	—	—	3	2	2	2	4	—	3	2	—	4	4
Catbird	1	—	—	—	—	—	—	—	—	—	—	—	1
Brown Thrasher	—	—	—	—	—	—	—	—	—	2	—	6	8
Sage Thrasher	—	—	—	—	—	—	—	—	—	1	—	—	—
Robin	5	—	2	3	—	1	4	—	3	3	—	6	11
Loggerhead Strike	—	—	3	1	1	1	—	—	—	—	—	1	1
Starling	—	—	11	—	3	1	4	—	—	5	—	1	—
Red-eyed Vireo	—	—	1	—	—	—	1	—	—	—	—	—	—
Warbling Vireo	—	—	—	2	—	—	—	—	—	—	—	—	—
Yellow Warbler	—	—	2	2	5	3	6	—	1	4	—	22	30
Yellowthroat	—	—	—	—	—	5	2	—	—	2	—	—	—
Yellow-breasted Chat	—	—	—	—	—	—	—	—	1	1	—	—	—
House Sparrow	—	—	—	—	—	—	—	—	5	—	—	—	6
Bobolink	—	—	—	—	—	—	—	—	1	—	—	—	—
Western Meadowlark	111	241	138	145	202	166	209	—	180	194	—	316	334
Yellow-headed Blackbird	—	—	7	—	—	3	4	—	—	—	—	—	—
Red-winged Blackbird	—	3	21	10	18	17	12	—	12	8	—	48	76
Bullock's Oriole	—	—	—	—	2	2	5	—	—	—	—	1	2
Brewer's Blackbird	—	—	—	2	3	8	27	—	5	1	—	34	20
Common Grackle	—	—	—	—	—	—	5	—	—	1	—	—	—
Brown-headed Cowbird	17	—	6	1	3	4	4	—	10	6	—	9	23
Lazuli Bunting	—	—	—	—	—	1	—	—	—	—	—	—	—
American Goldfinch	—	1	2	—	—	—	2	—	—	1	—	—	5
Rufous-sided Towhee	—	—	1	—	—	—	1	—	—	2	—	2	1
Lark Bunting	154	412	62	25	88	118	78	—	152	178	—	82	17
Grasshopper Sparrow	—	1	3	13	19	3	20	—	8	9	—	17	13
Baird's Sparrow	—	—	7	10	4	1	—	—	—	1	—	—	—
Vesper Sparrow	15	—	6	2	18	22	49	—	24	21	—	70	145
Lark Sparrow	—	6	10	6	4	4	3	—	3	1	—	2	25
Chipping Sparrow	—	—	18	—	—	—	—	—	—	—	—	—	—
Clay-colored Sparrow	—	—	—	—	—	5	—	—	—	—	—	—	—
Brewer's Sparrow	13	6	3	7	1	18	30	—	7	37	—	—	—
White-crowned Sparrow	2	—	—	—	—	—	—	—	—	—	—	—	—
Song Sparrow	—	—	1	—	1	—	—	—	—	—	—	—	—
Total Individuals	379	711	423	389	633	516	667	—	497	640	—	830	1129
Total Species	19	12	39	32	39	38	48	—	34	37	—	40	42

APPENDIX P

TERRITORIAL AND REPRODUCTIVE STATUS OF BIRDS AS DERIVED FROM TRANSECT DATA

SPECIES	HABITAT	MINIMUM NUMBER OF TERRITORIAL PAIRS (a)	PAIRS W/NEST OR YOUNG (b)
Common Flicker	Creek	1	1
Eastern Kingbird	Creek	4	1
Western Wood Pewee	Creek	3	
Violet-green Swallow	Creek	1	
House Wren	Creek	6	1
Robin	Creek	2	
Mountain Bluebird	Creek	2	2
Yellow Warbler	Creek	8	3
Northern Oriole	Creek	3	3
Goldfinch	Creek	1	
Rufous-sided Towhee	Creek	4	2
Lark Sparrow	Creek	2	
Mourning Dove	Pine	4	
Common Flicker	Pine	1	
Western Wood Pewee	Pine	5	1
Violet-green Swallow	Pine	1	
Pinyon Jay	Pine	1	
Black-capped Chickadee	Pine	1	
White-breasted Nuthatch	Pine	2	1
Red-breasted Nuthatch	Pine	3	
House Wren	Pine	5	
Robin	Pine	4	1
Red Crossbill	Pine	2	
Rufous-sided Towhee	Pine	1	
Lark Sparrow	Pine	1	1
Chipping Sparrow	Pine	2	
Killdeer	Sagebrush	1	1
W. Meadowlark	Sagebrush	3	
Vesper Sparrow	Sagebrush	8	
W. Meadowlark	Grassland	14	1
Vesper Sparrow	Grassland	5	

a — This figure is an absolute minimum, derived by compilation of the observations for the transects.

b — Nests were recorded when observed; however, no special effort was made to locate nests.

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